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DISPERSION IN FINANCIAL ANALYSTS' EARNINGS FORECASTS AND SEASONED EQUITY OFFERINGS

Analysis of the Announcement Effect, the Long-Run Performance and the Choice of Issuance Method

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Abstract
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PURPOSE OF THE STUDY

The objective of this thesis is to analyze the effect of dispersion in financial analysts' earnings per share forecasts on the seasoned equity offerings. This thesis focuses on the price run-up phenomena, announcement effect, post-offer long-run performance and the choice of issuance method.

DATA

The sample used in this study consists of seasoned equity offerings (SEO) which have been launched by companies that have been included in the STOXX-600 index between January 1, 1995 and December 31, 2004. SEO data is collected from Thomson New Issues Database and the issue date is required to be within the years 1995-2004. Financial analyst forecast data is collected from I/B/E/S. The size and book-to-market data for abnormal return calculation are collected from Datastream and Worldscope.

RESULTS

The over-valued high-dispersion stocks are expected to have higher price run-up than other public offerings. Tests show that these stocks do have higher price run-up (p-value is 0.17). Positive performance of all portfolios before the offering is consistent with my theory. My theory suggests that high-dispersion stocks have poorer announcement returns. My test results are not consistent with the hypothesis but this can be partly explained by data availability. Negative announcement effect of all portfolios is consistent with my theory. I expect that high-dispersion stocks have poorer long-run performance and here the test results are strongly consistent with the hypothesis. I also argue that companies with high-dispersion should have increased likelihood of rights offerings. Test statistics are consistent with the theory.

In addition I assume that there are opportunistic companies that try to increase their market capitalization by active disclosure policy and earnings management. Test results which show that these companies have high price run-up, and poor announcement and long-run performance, are consistent with the opportunistic company theory.

KEYWORDS

Dispersion, announcement effect, long-run underperformance, rights offerings

Contents

1. Introduction

Financial analysts operate as information intermediaries and their forecasts have major impact on many trading decisions, therefore those forecasts are one the best proxies available for investors' information (Schipper, 1991; Lang and Lundholm, 1996). Dispersion in financial analysts' EPS forecasts is the main variable used in this thesis. The dispersion figure used in all tests is the standard deviation of EPS-forecasts scaled using book value per share which is measured at one year before the date of the I/B/E/S summary data is released.

There are many papers related to dispersion in financial analysts' earnings forecasts. For example there are studies on the effect of dispersion on cross-sectional return differences[1], on price responses to earnings announcements[2], on the post-earnings announcement drift[3], on volume effects of earnings releases[4] and the effect of disclosure on the level of dispersion[5]. However they are no papers studying the effect of dispersion on the announcement effect of seasoned equity offerings (SEO) or on the long-term underperformance of SEOs. There are also no papers dealing with the effect of dispersion on the choice of issuance method. This paper attempts to fill this gap. However there are many papers using different proxies for asymmetric information, for example based on volume, bid-ask spreads and ownership, but this thesis focuses only on the dispersion, because investors are used to use analyst information in their trading decisions. Dispersion is also a proxy for uncertainty in addition to asymmetric information. The results of this study have also practical motivation; using the results of my thesis investors can make better investment decisions and companies can potentially lower their cost of equity capital at the issuance.

The research problem of this paper is the effect of forecast dispersion on the announcement effect of seasoned equity offerings, on the price run-up phenomena, on the long-run underperformance of SEOs and on the firms' choice of issuance method. As a conclusion this thesis tries to explain

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[1] For example Diether et al. (2002), Scherbina (2001), Johnson (2004) and L'Her and Suret (1996)
[2] For example Imhoff and Lobo (1992), Lobo and Tung (2000), Kormendi and Lipe (1987) and Lipe (1990)
[3] For example Liang (2003), Alford and Berger (1997) and Kim and Kim (2003)
[4] For example Ajinkya et al. (1991), Bamber et al. (1997), Barron (1995) and Atiase and Bamber (1994)
[5] For example Lang and Lundholm (1996), Healy et al. (1999), Barron et al. (1999) and Bowen et al. (2002)

the role that forecast dispersion plays in the equity issuance process. I expect to find that at least part of the announcement effect[6] and long-term underperformance[7] of seasoned equity issues can be explained by portioning the sample to groups based on the dispersion. I also try to explain the choice between rights and public offerings[8] using the dispersion levels before the offering.

My sample includes all public and rights offerings launched between 1995 and 2004 by stocks that have been included in the Dow Jones STOXX-600 index between January 1 1995 and December 31 2005. Data is collected from Thomson, Datastream, I/B/E/S and Worldscope. The initial sample size is 1513 seasoned equity offerings. My main tests compare the abnormal performance between different groups of issuing stocks and by using this method many statistical problems can be mitigated.

My price run-up hypothesis assumes that the overvalued high-dispersion stocks are associated with higher price run-up than other public offerings. It turns out that these stocks do have higher price run-up, but the results are not statistically significant (p-value is 0.17). All portfolios have positive performance before the offering and this is consistent with my theory. My second hypothesis is that the high-dispersion stocks have poorer announcement returns. Here my test results are not consistent with the hypothesis. However this can be partly related to the use of issue date data instead of announcement date data. All portfolios have negative announcement effect, which is consistent with my theory. Thirdly I expect that high-dispersion stocks which have launched public offerings have poorer long-run performance. Here the test results are strongly consistent with this hypothesis. Fourthly I argue that companies with high-dispersion levels should have increased likelihood of rights offerings. Here again the test statistics are consistent with the theory.

In addition to theory based on the dispersion levels I assume that there are opportunistic companies that try to increase their market capitalization by active disclosure policy and earnings

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[6] Approximately -3% effect has been found by for example Mikkelson and Partch (1986), Masulis and Korwar (1986) and Asquith and Mullins (1986). Rights offerings and non-US offerings are found to have lower announcement effect (for example Gajevsky and Ginlinger (2002), Eckbo and Masulis (1992), Cooney et al. (1997)

[7] SEOs and also IPOs are found to have significant underperformance after the equity issuance by Ritter (1991), Loughran and Ritter (1995), Spiess and Afleck-Graves (1995).

[8] Look at Eckbo and Masulis's (1992) paper about rights offer paradox

management. Therefore these companies should be associated with higher price run-up, and poorer announcement and long-run performance than other issuing companies. Test results turn out to be consistent with the opportunistic company theory.

This thesis is organized as follows; first literature review, then data and estimation methods are presented. After that I present the theory based on the earlier research and the hypotheses I have formed. Finally empirical test results are shown and the last part concludes.

2. Literature review

This thesis combines numerous research branches. First, I present the variables for which dispersion is used as a proxy. Then many empirical papers of the effect of dispersion on returns are presented. In addition some hypotheses-related theoretical papers analyzing the effects of divergence of opinion and estimation risk are briefly explained. Thirdly I discuss the literature on the announcement effects of equity issuance and fourthly I discuss the long-term abnormal returns following the equity issuance. Fifth part of the literature review deals with the disclosure of information. In the sixth part of the review I present literature related to rights offering paradox.

2.1. Overview of Dispersion literature

This part covers the overview of dispersion literature focusing on the use of dispersion as a proxy and the relationship between returns and dispersion. I have divided the return part to two: divergence of opinion and uncertainty, because dispersion is used as a proxy for both of these variables as shown in the proxy part. I also present some papers trying to explain the observed return association of dispersion using the theories of behavioral finance.

2.1.1. Use of dispersion as a proxy

Dispersion has been used as a proxy for two different functions which are asymmetric information and uncertainty. Barron et al. (1998, 1999) suggest that the level of dispersion is determining the dominant effect and they model dispersion as follows:

$$D = V(1-\rho) \tag{1}$$

Where D is forecast dispersion, V is the level of uncertainty and ρ is the correlation in forecast errors across analysts. 1-ρ measures the amount of information asymmetry among analysts. The dispersion is an increasing function of uncertainty and a decreasing function of consensus.

Barron et al.'s (1998, 1999) model is based on the fact that all analysts observe equally precise, but potentially different information. There are common public signals observed by every analyst and also there are private idiosyncratic signals observed by individual analysts. The dispersion reflects only the idiosyncratic error and the error related to common public signals affects only the mean forecast. They also propose that high quality public information results in a more level information playing field and less dispersion among the analysts. Liang (2003) tests Barron et al (1998) model and he finds that dispersion has high positive correlation with the level of uncertainty and high negative correlation with correlation in forecasts errors across analysts.

2.1.2. Dispersion and divergence of opinion

In this section I briefly explain the theory presented by Miller (1977) and numerous empirical papers related to dispersion's effect on returns. I show also some empirical evidence about the short-sale constraints. Most papers have found that dispersion and returns are negatively associated.

2.1.2.1. Miller's (1977) theory

Miller's (1977) theory is based on the assumption that the demand for stocks is downward-sloping. Optimists hold the stock, because they have the highest valuation based on their optimistic view of the stock and they have bid up the price above the level that average investor perceives as fair. High short-sale costs exclude pessimists from the market and therefore the stock prices reflect only the high valuation by optimists. Therefore stocks with high divergence of opinion are overpriced and this will cause these stocks to underperform in the long-run. The elimination of short-sale constraint will result in an increased supply of stock, because pessimists start selling shares to optimists. This will cause stock prices to fall.

Jarrow (1980) argues that the inclusion of expectations for the covariance matrix of future asset prices could easily change the main results of Miller's (1977) model. Using single-period mean variance model, he shows that mean risky asset prices could increase or fall as dispersion increases when investors disagree about the covariance matrix of next period's asset prices. The agreement causes them always to rise, which is consistent with Miller's (1977) theory.

Scherbina's (2001) theoretical model is an extension of Miller's theory, because she models investors as boundedly rational agents. The bounded rationality idea is based on Harris and Raviv (1993) model. Their theory means that investors are interpreting signals regarding the stock value using different models and dogmatically believe in their own valuations. Scherbina's paper suggests that informed investors base their stock valuations on their private information and convey that information to the market through trades. Because of short-sale restrictions, low-valuation investors stay out of the market. The boundedly rational investors may erroneously assume that low-valuation investors do not trade because their valuation equals the market price and therefore the market price will be upward biased.

2.1.2.1.1. Short-sale constraints

Short-sale constraints are empirically found to be significant, for example the de-facto removal of short-sale constraints by introducing options have found to drive down the price of the underlying stock (Danielsen and Sorescu, 2001). They also find that the standard deviation of investors' expectations of the company's future value is positively related to the degree of overpricing. Their model is inspired by the models from Jarrow (1980) and Miller (1977). D'Avolio (2002) documents numerous interesting results. Short sale constraints are small on average but those are systematically high when the differences of opinion are high. Most stocks can be borrowed; however small stocks are often impossible to short. 91% of stocks in his sample cost less than 1% per annum to borrow. The remaining 9% of stocks have a mean fee of 4.3% per annum. These stocks are associated with high dispersion in analyst forecasts. In addition the likelihood of recall is higher if disagreement among investors is high.

2.1.2.2. Empirical papers

Diether et al. (2002) find that stocks with higher dispersion in analysts' earnings forecasts earn significantly lower returns than otherwise similar stocks. For example the portfolio of stocks in lowest quintile of dispersion has 9.48% higher return per year than the portfolio of stocks in highest quintile. Small stocks and recently underperformed stocks have even bigger returns. They suggest that dispersion is a proxy for the differences of opinion among investors. Their results strongly support Miller's (1977) predictions. They strongly reject the interpretation of dispersion in analysts' forecasts as a measure of risk because they show that dispersion is negatively related to future returns. They propose that in addition to high short-sale costs any friction, such as incentive structure of analysts, which prevents the revelation of negative opinions, could cause the relation. High dispersion is associated with more self-censoring meaning that analysts may stop follow companies of which they have negative view. Therefore there are large optimistic biases in reported forecasts. This could lead to lower future returns.

Scherbina (2001) also provides empirical support for the Miller's (1977) model. She finds that stocks in the highest dispersion quintile have significantly underperformed stocks in the lowest dispersion quintile. The returns decline smoothly from the lowest to the highest dispersion class. The return differential between the low and high-dispersion stocks declines also with size. She suggests that small stocks should have higher dispersion, because there is less information available and in addition short-sale costs are higher. The difference is also higher for growth stocks when compared to value stocks. Gebhardt et al. (2001) find also negative relation between dispersion and future returns. They used dispersion as a proxy for risk when trying to explain implied cost of capital estimates and find that market assigns a higher risk premium to firms with lower dispersion in analyst forecasts. Alford and Berger (1997) use dispersion as a proxy for disagreement among analysts and found that dispersion is negatively related to returns.

There are also some papers that have found positive association between returns and dispersion; however those papers are using old samples and potentially biased estimation methods. For example Cragg and Malkiel (1982) report positive relations between dispersion and future returns using a small and old sample. Cragg and Malkiel (1968), Friend et al. (1978) and Harris (1986) have also found positive association between stock returns and dispersion in analysts' earnings forecasts. Peterson and Peterson (1982a) suggest that the changes in second moment of expectation distribution are related to equilibrium price, if short-sales are assumed to be restricted. They find that dispersion is positively and significantly related to returns in two of the four periods in their sample. Barry and Jennings (1992) find no impact of expectations' dispersion on prices.

Chen and Jiambalvo's (2004) unpublished working paper shows evidence, which is contradictory to the optimism idea of Diether et al. (2002). They study if bad news, which should be inconsistent with optimism, result in large negative price changes for stocks with high-dispersion compared to stock price reaction to bad news for firms with low dispersion. They measure bad news with negative unexpected earnings. However their results show that earnings response coefficient associated with bad news are smaller for high dispersion firms than for low dispersion firms. In addition, they also find that sorting based on standardized earnings surprises (SUE) related to quarterly earnings announcements makes the differences in returns related to dispersion

statistically insignificant. Based on this sorting experiment and regression analysis using SUE factor in addition to Fama and French (1995) factors and momentum factor, they argue that return differential found by Diether et al. (2002) is more likely related to the post-earnings announcement drift phenomena than differences in opinion and optimism.

Liu et al. (2004) find that stocks with lower forecast dispersion subsequently experience higher level of earnings, higher increase in earning over previous year and higher excess earnings relative to consensus forecasts. The effect persists at least three years. These measures are shown to be positively correlated to stock returns. They claim that companies with good earnings prospects are more willing to provide unbiased and accurate earnings guidance and because of this analysts rely less on their idiosyncratic sources of information. Therefore stocks with low dispersion tend to be stocks with high future earnings. They also claim that future stock returns are mainly explained by future earnings, rather than by forecast dispersion.

L'Her and Suret (1996) suggest that changes in dispersion should be studied simultaneously with the variation in the average forecast. Holthausen and Verrecchia (1990) have shown that changes in dispersion coincide often with important modification of average expectations; therefore the claim could have important effect on the interpretation of evidence related to dispersion's effect on returns. L'Her and Suret (1996) find using the framework of a noisy rational expectations equilibrium model that changes in dispersion have a significant negative effect on returns and effect of revisions of average forecasts is positive and greater in absolute value than dispersion effect.

2.1.3. Dispersion and uncertainty

In this part of the literature review few main theoretical papers related to estimation risk are presented. I argue that estimation risk is highly associated with the uncertainty in Barron et al.'s (1998, 1999) model. In addition empirical results related to relationship between estimation risk and returns are shown. Finally some evidence on the effect of firm characteristics on dispersion is shown.

2.1.3.1. Theoretical papers

Barry and Brown's (1985) Bayesian model suggests that cost of capital is a function of estimation risk and the better investors are able to assess the prospects for a company, the lower its expected cost of capital. The model allows that there are unequal amounts of information available for the securities and therefore the estimation risk varies across securities. They also show that the estimation risk and divergence of opinion are associated. More information leads to both lower estimation risk and more convergent opinions.

Barry and Brown (1984) argue that securities for which there is relatively little information available may be perceived as riskier than securities for which more information is available. Therefore market participants may rationally demand a premium to hold such securities. They also suggest that low market value securities have less information available and therefore abnormal returns are associated with small firms.

Barry and Jennings (1992) suggest that if there is more public information than there is private information per analyst in current forecasts then generation of new private information by analysts tend to lead toward more divergent forecasts. This result assumes that the private information stays private. They suggest based on their empirical results that divergence of opinion may produce misleading measurements of estimation risk compared to number of analyst, another proxy for estimation risk.

2.1.3.2. Empirical papers

There is some empirical evidence consistent with the theories presented in previous chapter. For example Peterson and Peterson (1982b), Givoly and Lakonishok (1988) and Amihud and Mendelson (1989) conclude that the market offers a premium for estimation or incomplete information risks linked to the dispersion of expectations.

However, there are also papers that have found negative association between the returns and dispersion used as a proxy for uncertainty. For example Ackert and Athanassakos (1997) find negative relation between standard deviation of analysts' estimates and future returns. They studied the relation between analysts' overoptimism and uncertainty with a small sample. Copeland et al. (2004) presented evidence that noise, with dispersion used as a proxy, has an impact on market prices when they studied the role of expectations in explaining the cross-section of stock returns. Greater noise increases the variability of total return to shareholders (TRS). In addition the noise is negatively associated with TRS.

Johnson (2004) has his own explanation for the relation between stock returns and analysts' dispersion. Johnson claims that both his theory and hypotheses presented by Diether et al's (2002) can be contributing the effect. He interprets the dispersion as a proxy for idiosyncratic parameter risk when fundamentals are unobservable. The level of parameter risk can vary between companies, because some businesses are inherently harder to assess than others. Companies act also as the source of the most relevant information and they are able to choose the amount they provide. He proposes that that in the case of levered firm, expected equity returns will decrease with the level of idiosyncratic asset risk due to the convexity. His empirical tests support his hypotheses.

2.1.3.3. Firm characteristics and dispersion

There are many papers that have studied the effect of firm characteristics to the forecast dispersion. For example Chambers et al. (2002) find that R&D intensive firms have significantly higher dispersion even if size and book-to-market are controlled. Barron et al. (2002) suggest that the usefulness of current earnings for predicting future earnings varies with the proportion of intangibles firm has and that the earnings are easier to forecast for low-intangible firms. They also show that there is lower degree of consensus among the analysts forecasting for high-intangibles firms. Harris (1986) finds that stocks with poorer credit rating have higher level of dispersion.

Bens and Monahan (2004) find that multi-segment firms have higher forecast dispersion than single-segment firms. Thomas's (2002) document that greater corporate diversification is associated with less dispersion among forecasts consistent with the information diversification effect. However after controlling for the differences in the volatility of abnormal returns between diversified and focused firms, diversification is associated with greater dispersion, consistent with the transparency effect. Krishnaswami and Subramaniam (1999) report that firms engaging in spin-offs have significantly higher level of dispersion compared to their industry- and size-matched counterparts. They also find that the dispersion decreases substantially after the completion of the spin-off.

Hope (2003) posts interesting results concerning the dispersion levels in different countries. The mean forecast dispersion is lowest in the United States and Japan and highest in Norway and Finland. My sample countries have considerably higher dispersion level compared to the United States except the United Kingdom. The cross-listing is found to reduce the dispersion; however the results were insignificant (Lang et al. (2003)). These results suggest that also the institutional and legal constraints affecting the company can have significant effects on the forecast dispersion.

Accounting choices can also make earnings forecasting harder, and therefore these decisions can be associated with the dispersion. Elliot and Philbrick (1990) finds that dispersion is higher during the years when accounting changes are made and the dispersion is correlated with the absolute value of income effect of the change. The effect is more significant in the absence of explicit disclosures about the change.

The earnings of high-dispersion stocks are found to be harder to estimate than earnings of low-dispersion stocks. Brown et al. (1987) find that the superior forecasting ability of analysts is related to characteristics of a firm's information environment: positive association with the firm size and negative association with the forecast dispersion. Wiedman (1996) documents that analyst forecast errors have higher association with excess returns than random walk forecast errors. This higher association is positively related to firm size and negatively related to forecast dispersion.

2.1.4. Dispersion and behavioral finance

This section of the literature review presents theoretical hypothesis by Liang (2003) related to the post-earnings announcement drift. These hypotheses are also applicable to any informative event. The drift arises because of market inefficiencies caused by investors' non-Bayesian behavior and the magnitude of drift is associated with the level of dispersion. His empirical results are consistent with his hypotheses.

2.1.4.1. Overreaction to private information

The overreaction to private information hypothesis by Liang (2003) is based on Daniel et al. (1998) and Fischer (2001). These models show that drift arises when part of the investors overreact to their private information and underweight the public sources. The private information in these models is not necessarily better or inside information, instead it is only heterogeneous information. The overreaction is caused by investors' overconfidence on their investment skills. Daniel et al. (1998) also assume that investors have biased self-attribution meaning that when investors receive confirming public information, their confidence rises, but disconfirming information causes only a modest fall in confidence. If these overconfident investors can influence the stock market, stocks with more heterogeneous information across investors, high-dispersion stocks, will have bigger drift.

2.1.4.2. Overreaction to unreliable information

The overreaction to unreliable information hypothesis by Liang (2003) is based on Griffin and Tversky (1992). Bloomfield et al. (2000) adapt the model by Griffin and Tversky in their coin-flipping experiment. Bayesian investors have only a noisy signal of the reliability of their information. The model predicts that prices tend to overreact to unreliable information and underreact to reliable information. In addition the more reliable information is associated with larger observed under-reaction. Stocks with more reliable information are stocks with less

uncertainty and therefore less forecast dispersion. The results are caused by the phenomenon called the moderated confidence, meaning that investors' confidence is moderated toward a central level.

2.2. Announcement effect of equity offerings

This section of literature review includes presentation of main theoretical papers, empirical papers related to public and rights offerings by US-firms and non-US firms. In addition the relation between announcement effect and firm characteristics is covered. Finally some evidence is shown related to short-term abnormal returns following the issuance.

2.2.1. Theoretical papers

Myers and Majluf (1984) and Miller and Rock (1985) models assume that the choice of security issued is associated with management's superior information about the firm's earnings prospects, investment opportunities available or assets in place compared to outside information available to investors. These models suggest that the announcement of new equity offering conveys unfavorable information to the market.

Miller and Rock (1985) uses signaling model, in which the firm's sources and uses of funds constraint is used to show that if the investment decisions of firm are unchanged, then equity issues on average convey negative information about the future earnings potential of the firm. Myers and Majluf (1984) adverse selection model is based on the assumption that managers try to issue overvalued equity, because managers are acting in the best interests of current stockholders. Their model and also the extension of Miller and Rock's (1985) model by Krasker (1986) suggest that the issue size should have effect on the announcement effect of equity issues. Ross' (1977) model suggests that equity issue announcement release negative information about the firm and therefore it should be associated with a price drop.

An extension of Myers and Majluf (1984) model by Korajczyk et al. (1992) suggest that information tend to arrive discretely either through voluntary or involuntary disclosures and therefore the information asymmetry levels are expected to vary over time. Because of time-varying asymmetric information the magnitude of adverse selection cost will also vary and therefore company can partly control the size of a price drop. This theory suggest that companies time their equity offerings after information releases and that the price drop is increasing function of the time since last information release.

2.2.2. Announcement effect of public offerings

Mikkelson and Partch (1986) find that announcement of common stock issuance causes a -3.56% effect on returns. They suggest that investors infer that the market price exceeds the managers' assessment of share price when common stock offering is announced. This means that equity offering can be seen as examples of lemons problem (Akerlof, 1970). They interpret their results using both Myers and Majluf's (1984) and Miller and Rock's (1985) models. They also find evidence that completed offerings are associated with a positive return between the announcement and issuance and negative return at the issuance. On the other hand cancelled offerings are associated with negative return between the announcement and cancellation and positive return at the cancellation. They suggest that this evidence is consistent with managers trying to issue overvalued equity and that the investors understand managers' incentives. In addition they document that there are further drop of 0.65% at the issue date.

Masulis and Korwar (1986) and Asquith and Mullins (1986) found also approximately -3% effect. Similar results are also find by Mikkelson and Partch (1985) and Hess and Bhagat (1986). Smith (1986) documents that in average stock return of -3.14% follows new equity offering announcement. Tripathy and Rao (1992) document two-day announcement period excess return of -2.6%. Twenty-day pre-announcement period excess return of 12.4% is consistent with price run-up effect. For example Asquith and Mullins (1986) have reported similar price run-up before the offerings.

Barclay and Litzenberger (1988) studied the announcement effect of seasoned equity offerings using intraday transaction prices and exact announcement times. They argue that this data allows them to make more powerful estimation of the effects of new information on stock prices. They find that there is a statistically significant negative return during the hour before the first public announcement, suggesting that there might be some insider trading. During 15 minutes following the announcement, stock prices fall on average 1.3%. In addition they find return of -2.4% during the three-hour period surrounding the announcement.

2.2.3. Association between firm characteristics and the announcement effect

Factors affecting managers' motivation to issue overvalued equity and potential magnitude of over-valuation are found to contribute the severity of announcement effect. For example Mikkelson and Partch (1986) find that the price drop is greater for offerings in which managers participate. D'Mello and Ferris (2000) present evidence that firms with more information asymmetry have significantly more negative announcement period returns. Barclay and Litzenberger (1988) find that the intended use of proceeds does not have a statistically significant effect on the observed returns. However Mikkelson and Partch (1986) show that equity offerings motivated by pure financing considerations have different effect compared to offerings motivated by financing and investment considerations.

The evidence related to the effect of size on the abnormal returns around the announcement day is ambiguous. Asquith and Mullins (1986) find that larger offerings generate a greater price drop at the announcement consistent with the main theoretical papers. Similar relationship is also observed by Masulis and Korwar (1986). Barclay and Litzenberger (1988) on the other hand find that the size of issue has not a statistically significant effect on the observed returns. Similarly Mikkelson and Partch (1986) report that size is not significantly related to the announcement effect.

Bhagat et al. (1985) document that unsystematic risk of the stock is positively related to the price drop at the announcement date. Loderer, Cooney and Van Drunen (1991) find -2.8% significant average abnormal return for the industrial issuers and significant -0.8% for the regulated issuers. Eckbo and Masulis (1992) document similar evidence: firm-commitment offers by industrial issuers (utility issuers) have highly significant abnormal return of -3.34% (-0.80%) at the announcement. These results suggest that also the industry in which company is operating can have effect on the announcement effect.

2.2.4. Announcement effect of rights offerings and non-US public offerings

Eckbo and Masulis (1992) find that stand-by rights by industrial issuers (utility issuers) have significant abnormal return of -1.03% (-0.53%) during the announcement-period. Uninsured rights have insignificant abnormal returns, -1.39% for industrials and 0.23% for utilities. Gajevsky and Ginlinger (2002) research the announcement effects of French right offerings and find that those have significantly negative effect of approximately 1.5%. Similar evidence is also reported by Singh (1997) and Bohren et al (1997). Smith (1977) reports zero announcement-month abnormal performance in right offerings. White and Lusztig (1980) show evidence that the average market reaction to rights offer is negative. Hansen (1988) studies the stand-by rights and finds announcement-period abnormal returns of -2.61% for industrials and -1.21% for utilities. As a conclusion the announcement of rights offerings is associated with a small negative abnormal return, and the magnitude of the effect is considerably lower than in public offerings. This is consistent with Eckbo and Masulis' (1992) theory, that public offerings are expected to be associated with bigger announcement effect than rights offerings.

French public offers are also included to Gajevsky and Ginlinger's (2002) sample and they find that the announcement effect is lightly negative but insignificant. However their sample of public offerings is quite limited. Nonnegative announcement effects of public offerings issued by non-US issuers have been found for example by Cooney et al (1997) with Japanese data and Slovin et al (2000) with the UK data.

2.2.5. Abnormal returns following the issuance

Spiess and Affleck-Graves (1995) find that returns during the month after the SEO are significantly positive. Similar kind of short-term results have been documented by Tripathy and Rao (1992) and Mikkelson and Partch (1986). Barclay and Litzenberger (1988) find also a statistically significant positive return following the issuance. Loderer, Sheehan and Kadlec (1991) post that is possible to earn excess returns by holding seasoned issues for 30 days, with the biggest excess returns available in the NASDAQ.

2.3. Long-term effect of equity offerings

This part of the literature review presents empirical evidence about the long-term abnormal returns following equity offerings and relationship between firm characteristics and long-term abnormal returns. Finally statistical problems related to these papers are explained.

2.3.1. Long-term effects of IPOs

Ritter (1991) finds that Initial Public Offerings (IPO) underperform their first three years of trading. Mean (median) post-IPO size- and industry-matched returns are -27% (-55%). He suggests that investors are periodically overoptimistic about the earnings potential of young growth companies and this fads explanation makes the informational efficiency of the IPO market questionable. Issuers are able to take advantage of windows of opportunities. He also finds some evidence that stocks with high initial returns have poorer long-term performance and therefore he argues that this evidence is mildly supporting the overreaction hypothesis by DeBondt and Thaler (1985, 1987).

Similar kinds of results are posted by numerous papers. Aggarwal and Rivoli (1990) find that investors purchasing at the closing price on the first day after the issuance and hold 250 days have significantly negative excess returns. They suggest that their results are consistent with

hypothesis that IPOs are subject to overvaluation or fads in the early aftermarket trading. The results by Stoll and Curley (1970) show that in the long-run, investors in small IPOs have poor performance. Reilly (1977) find that IPOs purchased in early aftermarket trading underperform their first year. Ritter (1984) studies the long-term performance of natural resource sector IPOs during the hot market period and finds an underperformance of 15%. He concludes that his results are consistent with a speculative bubble in the aftermarket trading. The underperformance of IPOs is also reported by Loughran et al (1994) and Levis (1993) using UK sample.

There are also few papers that have documented less dramatic long-term performance following initial public offerings. For example Asquith and Mullins (1986) find average or below-average performance in the 480 days following the announcement. Ibbotson (1975) show evidence that IPOs insignificantly underperform by approximately 1% per month in the second through fourth year of public trading. However he finds that IPOs have insignificant positive abnormal returns during the first and fifth year of trading.

Ritter and Welch (2002) suggest that the long-run performance of IPOs is sensitive to choice of econometric methodology and sample period. For example they document that the average IPO underperformed the CRSP value-weighted index by 23.4% but size and book-to-market matched seasoned companies by only 5.1%. This explains the results that Brav and Gompers (1997) document. They find no signs of abnormal performance after controlling both the size and the book-to-market equity. The abnormal performance vanishes also if value-weighted returns are used. These results suggest that this phenomenon is more related to small firms with low book-to-market ratio.

2.3.2 Long-term effects of SEOs

Loughran and Ritter (1995) find that both IPOs and SEOs significantly underperform in the long-run; investors would have had to invest 44% more money in the issuers than in nonissuers to have the same wealth five years after the issue date. There are no differences between the underperformance of SEOs and IPOs. They control only for the size, and therefore book-to-

market adjustments may change their results. However they argue that this adjustment would have changed their results only at minor extent. They suggest that firms are taking advantage of transitory windows of opportunity by issuing equity when they are substantially overvalued. In addition they find that issuing extreme winners dramatically underperform the non-issuing extreme winners.

Spiess and Affleck-Graves (1995) study only the SEOs that do not issue any secondary shares and find similar results: statistically significant book-to-market- and size-adjusted three-year abnormal return of -17.51%. They conclude that their results are consistent with managers being able to take advantage of firm-specific information and to issue overvalued equity.

There are also papers claiming that equity issues have normal long-term performance after the issuance. For example Brav et al. (1995) find that performance of SEO is similar to size- and book-to-market controlled matching stocks. Eckbo et al. (2000) document small but insignificant levels of SEO underperformance. Brav et al. (2000) argue that the poor long-run stock returns following equity issues are not unique to the issuers, and they suggest that is a manifestation of a broader patter in returns. IPO issuer returns are similar to benchmarks matched on firm size and book-to-market ratios but SEO returns show little underperformance related to various benchmarks. They argue that buy-and-hold returns (BHAR) magnify the underperformance and propose that significant underperformance found in many papers is caused by model misspecifications.

Jegadeesh (2000) on the other hand shows that evidence of SEOs long-term abnormal performance is robust, because it survives the best candidates for benchmark returns: equal- and value-weighted indexes, benchmark constructed based on firm-specific characters and factor-model benchmark. In addition he documents that SEOs underperform twice as much during the earnings announcement windows as they do outside the windows. He concludes that market is overly optimistic about the long-term prospects of SEOs at the time of issuance. He also argues that his evidence is inconsistent with Fama's (1998) critique that long-term abnormal returns are caused by evaluation against wrong benchmark and therefore cross-sectional relations between firm characteristics causes the abnormal underperformance.

2.3.3. Long-term effects of rights offerings

Burch et al. (2004) study the post-offer performance of right offers and firm commitment offers using data from the 1930s and 1940s. This time period allows them to compare the long-term performance of rights and public offerings using US data. They suggest that managers trying to exploit private information and issue overvalued equity are more likely to do so at the expense of new outside investors by choosing a firm commitment over a rights offering. They find that both issuance methods are associated with significantly positive abnormal performance before the offering. However the long-term performance following the offer differs significantly: the firm commitment firms have more negative abnormal returns during the year following the offer. They argue that this evidence shows that firms using rights offers are not timing their issues to capitalize on the overvalued equity and that the underperformance of firm commitments is tied to timing.

2.3.4. Firm and offering characteristics and long-term effects of equity offerings

The evidence concerning the relationship between the IPO volume and the long-term underperformance is somewhat ambiguous. Ritter (1991) finds that there are negative relation between annual volume and aftermarket performance. Similarly Loughran and Ritter (1995) document that the underperformance varies over years: the firms selling stock during high-volume periods are underperforming most. Lowry (2003) retests Ritter's (1991) hypotheses with her own sample and argues that the statistical significance will disappear if value-weighted returns are used instead of equally-weighted. She suggests that the relation is sensitive to the model of expected returns. In addition Spiess and Affleck-Graves (1995) find that the underperformance is not concentrated in certain years.

Ritter (1991) finds that the industry in which the firm operates and the age of firm have considerable effect on the underperformance. He shows that the long-run performance varies considerably in different industries, for example financial institutions perform well and oil and

gas firms outperform substantially during his sample period. In addition younger firms are found to have poorer long-tem performance than older ones.

The market perception of the offering quality is found to have significant effect on the long-term underperformance. For example Carter et al. (1998) study the relationship between the IPO long-run performance and underwriter reputation. They find that the better the underwriter reputation the less severe is the long-term underperformance. Their overall underperformance results are similar to Loughran and Ritter (1995) IPO-results. Michaely and Shaw (1994) report also that IPOs handled by lower-reputation underwriters have more negative long-run returns. Brav and Gompers (1997) find that venture-backed IPOs outperform non-venture-backed IPOs in the five years following the offer.

There are also papers studying if firms that have tried to maximize their valuation at the issuance by earnings management will suffer from poorer long-term performance. For example Teoh et al. (1998a) study the relation between earnings management and IPO long-term underperformance. They find that discretionary current accruals are good predictors of subsequent three-year abnormal performance. The buy-and-hold return differential between the aggressive and conservative earnings managers is 15 to 30%. Teoh et al. (1998b) test the effect of earnings management on the long-term underperformance of SEOs. They suggest that investors are not fully adjusting for the potential manipulation of reported earnings. Issuers post better net income growth figures in the offering year than non-issuers, but post-offering figures are significantly lower. The discretionary current accruals drive the post-offering earnings underperformance similarly as in the case of IPOs. The difference in post-offering stock return underperformance between the aggressive and conservative is even higher than the difference in IPO sample.

2.3.5. Statistical problems related to long-term return estimation

Numerous techniques are used in long-term event studies. However many of those techniques are suffering from statistical problems. For example Conrad and Kaul (1993) document a potential upward or downward bias if short-term abnormal returns are cumulated over long periods and

suggest using holding-period returns. They argue that biases in short term returns, for example related to bid-ask spreads, nonsynchronous trading and price discreteness, are also cumulated when long-term returns are calculated using short-term returns.

One of the most popular methods used in measuring long-term abnormal stock price performance is the mean buy-and-hold abnormal return (BHAR). For example Barber and Lyon (1997) and Kothari and Warner (1997) have shown that BHAR method can produce biased estimates. They suggest that the biases can be eliminated by using carefully constructed benchmark portfolios and bootstrapping method. Fama (1998) argues also against the BHAR; he claims that systematic errors caused by imperfect expected return proxies are compounded with long-term returns. In addition BHAR ignores the cross-sectional dependence of event-firm abnormal returns that are overlapping in calendar time. He proposes a monthly calendar-time portfolio approach to measure long-term abnormal returns.

Barber et al. (1999) suggest that there are three causes for misspecification in tests for long-run abnormal returns. First there is a new listing or survivor bias that arises because sample firms are tracked for a long period and the firms included to the reference portfolio typically include firms that begin trading subsequent to the event month. Secondly the rebalancing bias arises because the compound returns of a reference portfolio are typically calculated assuming periodic rebalancing whereas the returns of sample firms are compounded without rebalancing. Thirdly the skewness bias arises because the distribution of long-run abnormal stock returns is positively skewed. This bias contributes also to the misspecification of the test statistics. They suggest that generally new listing biases are positive and other two negative.

Barber et al. (1999) propose two alternative approaches to control for these biases. First approach is based on BHAR method. The carefully constructed reference portfolio mitigates the new listing and rebalancing biases. There are two statistical methods that eliminate the skewness bias: a bootstrapped version of a skewness-adjusted t-statistics or empirical p-values calculated from the simulated distribution of mean long-run abnormal returns estimated from pseudoportfolios. However Barber et al. (1999) argue that these methods do not mitigate bias caused by cross-sectional dependence in sample observations and a poorly specified asset pricing model. The

second approach proposed by Barber et al. (1999) is the calendar-time portfolio, which eliminates the cross-sectional dependence problem. However they comment that this approach does not precisely measure investors' experience.

Mitchell and Stafford (2000) argue that the bootstrapping method has also statistical problems, because it assumes that event-firm abnormal returns are independent. They present evidence that cross-correlated abnormal returns have dramatically smaller test statistics even though the returns are similar in magnitude. Therefore they also advocate the use of calendar-time approach.

2.4. Disclosure of information

This part of the literature review includes brief presentation of theoretical models related to voluntary disclosure and its effect on asymmetric information. In addition empirical papers related to the effect of disclosure quality and special disclosure events on dispersion are presented. Then the effect of earnings release on the level of dispersion is shown. Finally some papers related to disclosure activity and dispersion around seasoned equity offerings are presented.

2.4.1. Theoretical papers

There are many theoretical papers related to voluntary disclosure and its effect on information asymmetry. For example Barry and Brown (1984, 1985) and Merton (1987) argue that voluntary disclosure lead to smaller information asymmetries between management and investors. Diamond and Verrecchia's (1994) model also suggests that voluntary disclosure lead to smaller information asymmetries. They argue that especially large companies could decrease their cost of capital by larger disclosure.

2.4.2. Disclosure quality and dispersion

Lang and Lundholm (1996) use the FAF reports[9] to find the effect of analysts' rankings of companies' disclosure on the properties of analysts' earnings forecasts. They find that firms with more informative disclosure have less dispersion in forecasts. In addition they show that forecast dispersion varies inversely with the market value of equity and number of analysts. They argue that the decrease in dispersion is caused by analyst giving less weight on their private information as the informativeness of firm-provided disclosure increases.

Healy et al. (1995) find also that higher quality financial reporting is associated with smaller dispersion in financial analysts' forecasts. Barron et al. (1999) find that companies with highly rated[10] Management Discussion and Analysis (MD&A) are associated with less dispersion in analysts' forecasts. Healy et al. (1999) investigate whether companies with sustained improvements in disclosure experience improved stock performance and capital market intermediation. They expect to find that dispersion declines after expanded disclosure. The median dispersion of improver firms is comparable to peers before the change in disclosure and insignificantly lower during the event period.

Hope (2003) studies how firms' disclosures of their accounting policies in the annual reports affect analyst forecasts using an international sample. He finds that the accounting policy disclosure[11] is negatively associated with forecast dispersion. He argues that increased accounting policy disclosure reduces the uncertainty about future earnings.

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[9] Report of the Financial Analysts Federation Corporate Information Committee, in those reports analysts evaluate the complete range of a firm's disclosure, there are three summarizing scores: annual published information, other published information and investor relations.

[10] The Securities and Exchange Commission (SEC) conducted a review of a sample of MD&As in the late 1980s, Securities Act Release No. 6835 (May 18 1989)

[11] The firm-level measurement done by Center for International Financial Analysis and Research

2.4.3. Voluntary disclosure and dispersion

There are many papers studying the effect of management initiated voluntary disclosure on the forecast dispersion. For example Francis et al. (1997) report that manager's presentations to security analysts have no effect on analysts' forecast dispersion. Bowen et al. (2002) find that conference calls decrease dispersion in analysts' forecasts during the quarter of conference call. Their sample is based on conference calls arranged before the adoption of Regulation Fair Disclosure[12] and therefore the results may not be applicable anymore. Clement et al. (2003) study the confirming management earnings forecasts which are voluntary forecasts that corroborate existing market expectations. They find that uncertainty (dispersion) decreases around the confirming forecast date. Baginski et al. (1993) study the effect of precision of management earnings forecasts on dispersion and equity pricing. They document that if managers release a forecast with a relatively wide range, forecast dispersion will increase.

2.4.4. Earnings releases and dispersion

There are a few papers studying the effect of earnings releases on the level of dispersion. For example Morse et al. (1991) find that earnings forecasts become more dispersed after the annual earnings releases using I/B/E/S Summary reports. The divergence is greater if earnings release contains a bigger surprise. Their model assumes that analysts to disagree about the perceived accuracy of the signal. Brown and Han (1992) study the effect of annual earnings release on cross-sectional variance of analysts' forecasts using I/B/E/S Detail data. Their results are different than the results of Morse et al. (1991). Significant decreases in variance are observed in the seven smallest categories of standardized surprise and significant increases happen only in the largest category. They suggest that consistent evidence cannot be obtained using I/B/E/S Summary data.

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[12] Regulation Fair Disclosure (Reg FD) prohibits selective disclosure of material information. There are many papers studying the effect of Reg FD on the dispersion, for example Bailey et al. (2003), Irani and Karamanou (2003) and Heflin et al. (2003)

There are some papers that analyze how better quarterly disclosure affects the dispersion. For example Botosan and Harris (2000) study the companies that have initiated quarterly segment disclosures. They document that during the two-year period before the change year, the change firms experience an increase in information asymmetry (dispersion). However the change itself has not significant effect on dispersion. Swaminathan (1991) studies the effect of SEC requirement that multi-segment firms have to disclose segment revenue and income in their 10-K reports on divergence of beliefs. They find that divergence of beliefs (forecast variation coefficient) decrease and that the decrease is proportional to the number of segments

2.4.5. Disclosure around seasoned equity offerings

Lang and Lundholm's (2000) paper studies the corporate disclosure activity around seasoned equity offerings. Firms have strong incentives to change their disclosure policy, because they can reduce their cost of equity capital by decreasing the information asymmetries[13]. The sample and control firms have comparable disclosure activity in terms of frequency and tone up to six months before the offering announcement. After the six-month break-point the issuing firms increase considerably their disclosure activity. Disclosures are made more frequently and more details and management interpretations are offered. Firms with selling shareholders disclose even more. Firms that maintain consistent level of disclosure experience stock price increases before the announcement, minor announcement effect and no abnormal performance after the offering. Hyping firms[14] on the other hand have similar price run-up, much larger announcement effect and these stocks also underperform in the long-run.

There are many papers in addition to Lang and Lundholm (2000) that have studied the disclosure activity around public issuance. For example Healy et al. (1999) test if companies issue public securities more often after the increase in disclosure and they find that there are more offerings and also that the total dollar amount issued increases significantly. Gibbins et al. (1990) document that the frequency of issuance influences companies' disclosure activity. Frankel et al.

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[13] Market conditioning disallowance in security laws limits companies' actions

[14] Firms that increase their disclosure activity before the offering, but don't maintain the higher activity after the offering

(1995) study the association between firm's external financing decisions and their tendencies to disclose earnings forecasts. They find positive association over long-period of time. Ruland et al. (1990) find that firms that issue management forecasts are more likely to finance externally in the subsequent three months than companies which do not forecast. Issuing companies have also higher disclosure ratings (Lang and Lundholm, 1993).

Marquardt and Wiedman (1998) examine the impact of insider selling through equity offerings on the likelihood of management earnings forecasts and the overall level of information asymmetry prior to the registration of the offering. They find evidence that firms with managerial participation in the offering have increased voluntary disclosure and closer timing of the equity offering registration to the previous earnings announcement. Dispersion is higher if the management does not participate in the offering. There are two scenarios that can explain the evidence. First scenario is that managers decide to launch the offering when low information asymmetry is observed; managers time the equity offerings so that they can capitalize on the windows of opportunity. Second scenario is that after offering decision, active voluntary disclosure policy is chosen to lower the information asymmetry.

Korajczyk et al. (1991) present a theory that information asymmetry is at its lowest level at the time of an earnings release. They suggest that firm should issue risky securities when the market is most informed, because the more symmetric information will made announcement effect of the equity offering smaller. They find that announcements of stock offerings are clustered in the few weeks following the earnings announcements. Those releases are also unusually informative and often convey positive news. In addition they document that the price drop is increasing in time since preceding earnings release. They argue that their evidence is consistent with adverse selection affecting the pricing and timing of equity offerings.

Dierkens (1991) finds that the announcement effect of equity offerings varies systematically with residual variance. Her results show also that there is significant negative relationship between the residual variance and the time lag between announcement and earnings release. Firms have tendency to time their equity issuance soon after the preceding quarterly earnings announcement. There are equal amounts of bad and good news before the issuance and good/bad news division

has no effect on the lag between earnings release and equity offering. She suggests that stocks with higher information asymmetries have bigger incentives to time their announcements of stock offerings closer to the earnings releases.

2.5. Rights offering paradox

Eckbo and Masulis' (1992) model tries to explain firm's choice of equity flotation method: uninsured rights, rights with standby underwriting or firm-commitment underwritten offers. In addition the model attempt to explain the disappearance of rights offerings in the United States. The preference for firm commitment offerings is a puzzle especially when rights offers have substantially lower direct flotation costs (Smith, 1977 and Eckbo and Masulis, 1992). Eckbo and Masulis suggest that the flotation costs of rights offerings can be low because of offer characteristics. With low return variance, high shareholder concentration and large blockholder guaranteeing the offering, also underwritten offers could have low costs.

Smith (1977) proposes that the paradox is caused by an agency problem; for example managers may receive personal benefits from underwriters. Managers can also face less strict shareholder monitoring if public offerings increase the shareholder dispersion. In addition the board may prefer the underwritten offers, because many companies have at least one investment banker in their board (Herman, 1981). There can be important shareholder-borne costs like capital gain taxes, transaction costs, and anti-dilution clauses causing wealth transfers to convertible-security holders, which are ignored or underestimated. (Eckbo and Masulis, 1992).

The model by Eckbo and Masulis tries to explain the choice of flotation method by adding cost named as adverse selection cost. Eckbo and Masulis (1992) model is an extension of Myers and Majluf (1984) model. The model allows more complex flotation methods and shareholders participation in the offering. In addition underwriters have informational role to play. The model assumes that issuer tries to maximize the benefits of firm's current shareholders. It includes also an exogenous constraint which limits the amount that can be sold directly to shareholders.

Eckbo and Masulis suggest that under-valued high shareholder participation issuers (=high k) select uninsured rights and inform the market about their high-k with subscription precommitments. Adverse-selection costs increase when k falls, since highly undervalued are now more likely not to issue. With enough low k-value firm choose firm commitment offer if it issues. Overvalued firms with high k can select uninsured right or firm commitment, if it wants to pool with undervalued low-k issuers. However there are risk that over-valuation is observed. Low-k companies choose the firm-commitment offers.

Eckbo and Masulis' model suggests that right offerings have less negative announcement effect. In addition price run-up differs between the flotation methods, because only firm-commitments have it. The model suggests that the greater the information asymmetry between the issuer and the market, the greater the probability that the offering will be underwritten. Eckbo and Masulis also argue that issuers with transparent production technology or high levels of mandated disclosure are more likely to issue via rights.

3. Data and sample

This part of the thesis includes the description of data and sample collection and the descriptive analysis of the sample. In addition the estimation procedures used are presented in this section.

3.1. Sample and data collection

This section covers the description of sample and data collection process and also deals with some data problems that earlier research has pointed out.

3.1.1. Sample collection

The sample used in this thesis includes companies of which stock has been included in Dow Jones STOXX 600 index between January 1 1995 and December 31 2005. The quarterly index selection lists are based on free-float market capitalization, 550 largest are always selected and 50 out of stocks that are ranked between 551 and 750[15]. The index universe covers stocks that are traded on the major exchanges of 17 European countries[16]. Only the most liquid stock class is included in the index universe. Deleted index-components are immediately replaced by the largest non-component stock. The deletion may be caused by illiquidity; stock is deleted if it has not been traded for 10 consecutive days, trading is suspended or if there are ongoing bankruptcy proceedings. The deletion may also be caused by large IPO or spin-off, which replaces the smaller stock. Non-surviving M&A participants are deleted if certain conditions are met even if there is still trading on the stock.

I have included the stocks to the sample for whole sample period, even though the companies would not have been in the index for the whole period. Therefore the sample includes also bankruptcies, delistings, IPOs and M&A-actions. The sample replicates the European large stock universe and with this choice of sample needed data is available for great majority of stocks. Especially the I/B/E/S universe covers only limited amount of smaller stocks. The exclusion of smaller stocks can make the observed effects less dramatic, but also it is easier to formulate a profitable trading strategy.

3.1.2. Data collection and problems related to collected data

Total return indexes, which are drawn from Datastream, are used to calculate logarithmic returns. Market capitalization and price-to-book value data is also from Datastream. Returns and market

[15] Before October 11, 1999 the number of stocks in the index wasn't fixed to 600. I have included the component data of STOXX size indexes to the sample. There were also some changes in calculation methods. For more information see STOXX press release published on September 9, 1999.

[16] The countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. More information on index composition and calculation methods from STOXX Limited internet page: www.stoxx.com

values are converted to US dollars. Book value per share data is collected from Worldscope. Analysts' earnings estimate data is drawn from the I/B/E/S.

The equity offerings sample is collected from Thomson Financial New Issues Database with including only follow-on common stock offering excluding private placements. The sample includes all equity issues done by sample companies with restrictions explained here. The sample includes also the offerings that have launched before the index addition and therefore the results can be positively biased. I have rerun the long-run performance test with unbiased sample that includes only the offerings that sample companies have arranged after the first addition to the index. The new test results show that there is a small positive bias in reported overall results but the bias affects all portfolios similarly and therefore the dispersion effect has not changed[17] and therefore I expect that the bias would change other results only at minor extent. Later research should confirm this suggestion. I have included only the successfully completed issues, because the long-run performance is one of the main subjects of this study. The issue date is required to be between January 1 1995 and December 31 2004. With these restrictions the initial sample size is 1513.

Diether et al. (2002) have found the standard-issue I/B/E/S data set unsuitable for their purposes, because I/B/E/S analysts' forecasts are adjusted historically for stock splits in order to produce a smooth time series of earnings per share estimates. Historical estimates are reported as if the number of shares outstanding would have always been same as today. I/B/E/S reports the adjusted figures after rounding the estimates to the nearest cent. Therefore the standard deviation of earnings estimates can be zero even though it is has actually been positive. I do not have the unadjusted forecast data set available and also for my purposes I find this problem less severe. Diether et al. (2002)' sample consists of much longer time-series which probably includes more splits. Also I am mainly interested in stocks with very high dispersion level, and those stocks are less likely to have zero standard deviation caused by rounding when compared to medium dispersion stocks. I assume that this may cause some minor bias to my results, which are making test procedures used less powerful.

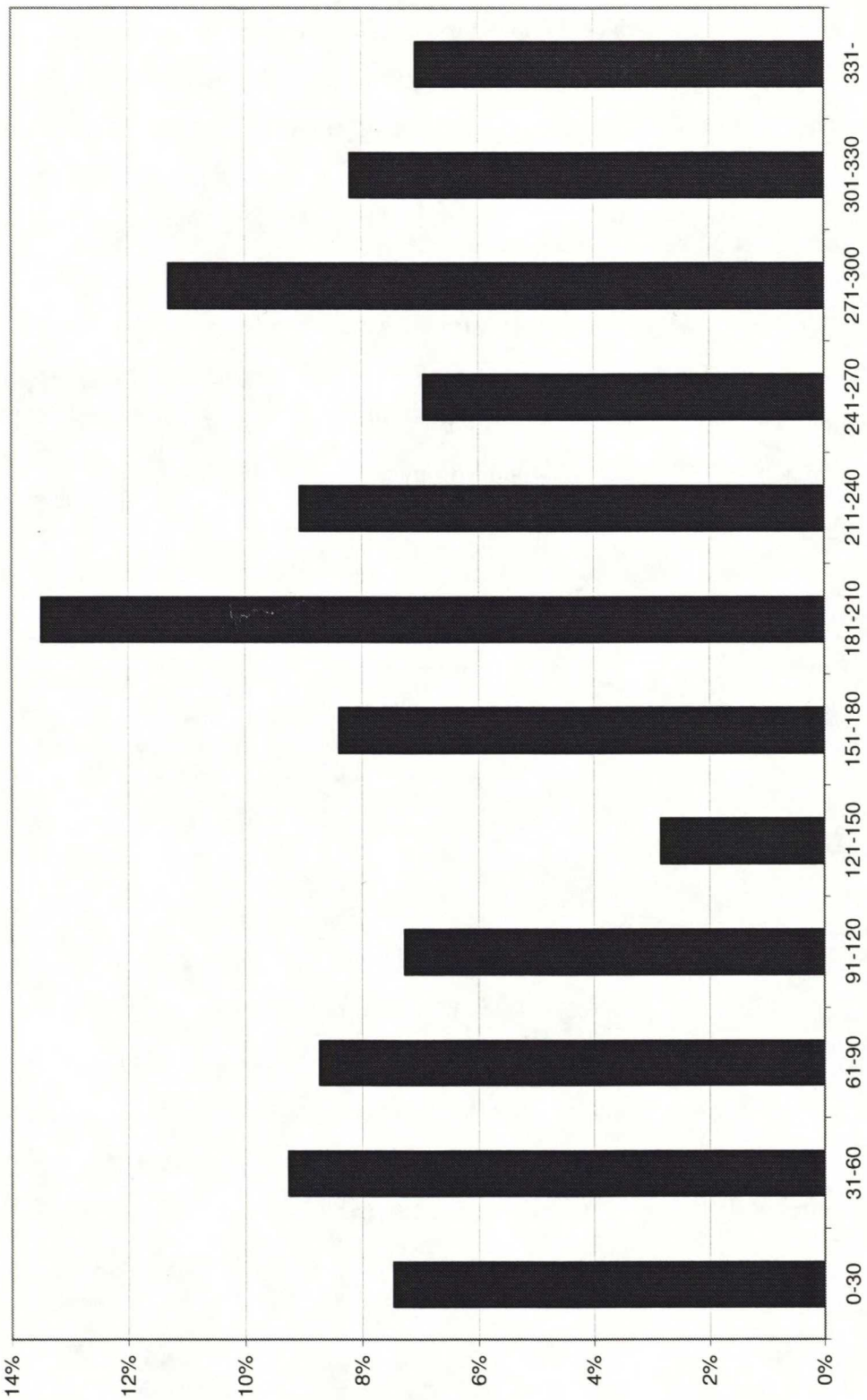
[17] The new results of long-run performance test are shown in the footnote 20

I have used the Summary History data set of I/B/E/S data. This set includes the summary statistics calculated on a basis of all outstanding forecasts as of the third Thursday of each month. Diether et al. have calculated their own statistics based on Detail History file to make sure that non-current estimates are not used in calculation. Their own calculations track closely the values given in the Summary History data set. They run their test using both statistics and the results were similar and they reported therefore only the results based on Summary History file and therefore the choice of data set used was easy. This choice can make test methods less powerful, because some stocks may have spuriously high level of dispersion caused by undated earnings forecast used in calculation of summary statistics reported by I/B/E/S. I have used the earnings per share estimates for the current fiscal year, because this is the most forecasted figure. The dispersion figure in tests is the standard deviation of the forecast divided by book value per share at end of the fiscal year n-1.

The timing of equity offerings could cause some biases to the dispersion figure. The time lag between the release of forecasted annual EPS figure and the announcement of equity offering will vary lot in the sample. Figure 1 shows that offerings are quite equally arranged through the calendar year, except that there are more offerings in March and June and fewer offerings in August. I have no information about the financial years of the companies and therefore more precise measurement of the lag is impossible. The remaining forecasting period has effect on the dispersion. Brown et al. (1985) observe a uniform reduction of the dispersion throughout the fiscal year using US data. L'Her and Suret using Canadian data find that dispersion increase first four months and after that decreases. At the end of the fiscal year, the level of dispersion is approximately same as in the beginning of the year. Some researchers, for example Danielsen and Sorescu (2001) have used a weighting technique to account for this fact. Their technique gives higher weight to the observations where the lag is small. I have not used any technique, because I assume that companies time their equity offering based on their dispersion level and therefore they take this lag into account in timing.

Brown et al. (1985) point out that there is a lag between analyst forecast revision and their publication by I/B/E/S. O'Brien (1988) finds an average delay of 34 trading days between an update and its inclusion in I/B/E/S, also the standard deviation was 44.5 days. They also find that

Figure 1: Calendar time division of the offerings



This figure shows the calendar division of offerings, both public and rights offerings combined. Offerings are classified to 12 groups based on the time until the last date of the year.

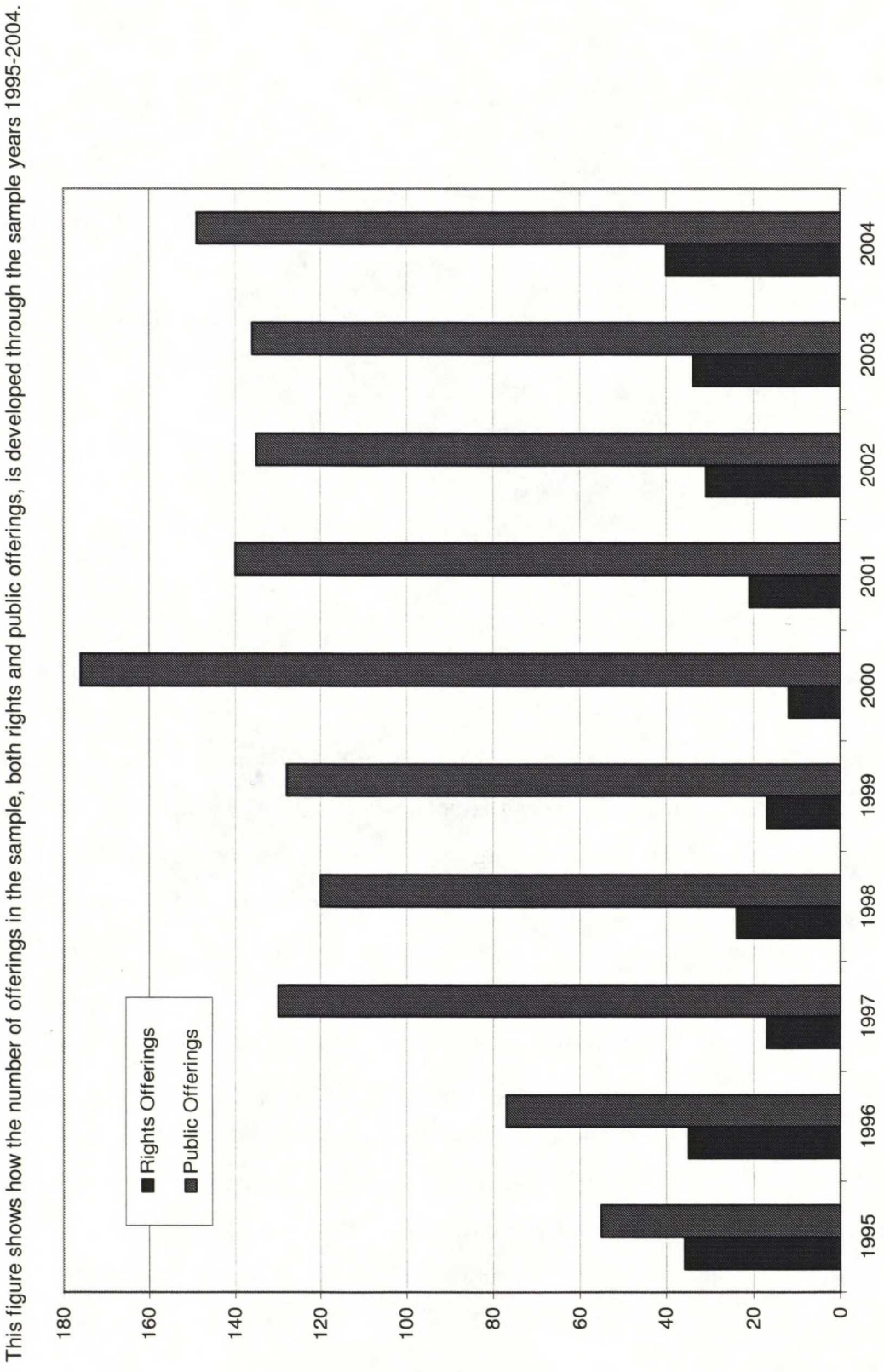
the most current forecasts available are more accurate than mean or median of all available forecasts. In addition to that Morse et al. (1991) point out that there is also delay by some analysts in updating their forecasts. This lag has no effect to my results because I only use dispersion level that is measured before the offering and therefore the potential effect of the offering on the dispersion is not included to my dispersion figures. The level is measured at one month before the month including the issue date, to exclude the effect of equity offering announcement on dispersion.

Many papers using dispersion have added a constraint that there must be certain number of valid estimates for the company. For example L'Her and Suret (1996) demand that at least 6 analysts have issued earnings forecast. I have not use any restrictions except the natural one that at least two forecasts are needed to calculate the standard deviation. My sample consists mainly of big companies with large following and therefore the problems related to low following have less material impact on my results compared to studies using the whole I/B/E/S universe. In addition I divide the sample only to two to four portfolios based on the dispersion level and therefore my estimates are not so sensitive to bias caused by small following compared to studies using more subtle partition of the sample.

3.2. Descriptive analysis of data

Figure 2 shows the annual division of the offerings. Years 1995 and 1996 have fewer public offerings than average year and year 2000 have more public offerings. The overall division is quite level. The frequency of public offerings has slightly increased through the years. The frequency of rights offerings has not increased, and this is probably related to the fact that companies are increasingly favoring public offerings. There are more rights offerings in years 1995 to 1996 and after 2001 than average year.

Figure 2: Annual division of the offerings



This figure shows how the number of offerings in the sample, both rights and public offerings, is developed through the sample years 1995-2004.

Table 1: The country composition of the offerings

This table shows the country composition of the total sample and sample divided to public and rights offerings.

Country	All Offerings	Public Offerings	Rights Offerings
Austria	2.1%	1.9%	3.0%
Belgium	1.9%	2.3%	0.0%
Denmark	2.4%	2.4%	2.3%
Finland	3.4%	3.7%	1.9%
France	13.9%	14.2%	12.4%
Germany	9.2%	8.0%	15.0%
Greece	2.1%	2.3%	0.8%
Ireland	2.1%	2.2%	1.9%
Italy	5.4%	4.3%	10.5%
Netherlands	6.1%	7.1%	1.5%
Norway	2.8%	3.2%	1.1%
Portugal	2.3%	1.4%	6.0%
Spain	5.6%	6.3%	2.6%
Sweden	3.1%	2.7%	5.2%
Switzerland	4.2%	4.1%	4.9%
United Kingdom	33.4%	34.0%	31.1%
Total	100.0%	100.0%	100.0%

The Table 1 presents the country composition of the issuers. Approximately one third of the issuers are British and both German and French issuers have about 10% share of the offerings. Finnish issuers have arranged 3.4% of the offerings. Many countries have big differences in the relative frequency of rights and public offerings. For example Austria, Germany, Italy, Portugal and Sweden have relatively more rights offerings in the sample than public offerings. On the other hand Belgium, Finland, Greece, Netherlands, Norway and Spain have relatively more public offerings. The remaining countries have almost equal percentage in both issuing methods.

Table 2 shows the macro industry composition of the issuing companies. Financials is biggest industry with approximately 20% share of the sample. Energy, high technology, industrials, materials and telecommunications have all approximately 10% share of the issuers. There are large differences in the likelihood of rights offerings in different macro industries. For example consumer products and services, healthcare, high technology, media and entertainment and telecommunications favor public offerings and consumer staples, financials, industrials and

materials favor rights offerings. As a conclusion companies selling direct to consumers are more likely to arrange a public offering.

Table 2: The industry composition of the offerings

This table shows the industry composition of the total sample and sample divided to public and rights offerings.

Macro Industry	All Offerings	Public Offerings	Rights Offerings
Consumer Products and Services	6.0%	6.4%	3.8%
Consumer Staples	4.2%	3.7%	6.7%
Energy and Power	8.5%	8.6%	7.9%
Financials	21.7%	21.0%	25.1%
Healthcare	3.9%	4.3%	1.9%
High Technology	10.1%	10.8%	6.7%
Industrials	11.6%	10.9%	15.0%
Materials	9.4%	8.3%	14.6%
Media and Entertainment	7.9%	8.8%	4.1%
Real Estate	2.8%	2.8%	3.0%
Retail	5.0%	4.7%	6.0%
Telecommunications	8.9%	9.7%	5.2%
Total	100.0%	100.0%	100.0%

Table 3 shows more descriptive statistics about the offerings. The average (median) offering size measured with total principal sold in all markets is 556 million USD (196 million USD). The average and median rights offers are bigger than public offers. The mean (median) proportional size measured with total principal of the offering divided by the market capitalization at the month before the offering month is 20.1% (7.3%). Rights offers have much higher proportional size in every measure except the mean, which is only somewhat higher. This fact is caused by the higher offering size and smaller issuers. Financially distressed companies are more likely to choose rights offerings and these offerings have very high proportional size. The average (median) market capitalization of the issuer at one month before the offering is 10 264 million USD (3 412 million USD). The market capitalization of the issuers choosing to use a rights offer method is only about a half of the market capitalization of issuers launching public offers. Book-to-market ratio measured at one month before the offering month is in average (median) 0.46 (0.39). Rights offers have much higher book-to-market ratios. Companies launching rights

offerings have no motive to issue overvalued equity and this can be seen easily from the book-to-market ratios.

Table 3 Descriptive statistics of the offerings and issuing companies

Descriptive statistics related to offering size, proportional offering size, market capitalization and book-to-market ratios are included in this table. Offering size is total proceeds of the offering in all markets combined. Proportional offering size is the offering size divided by market capitalization. Market capitalization and offering size are based on figures measured month before the offering month.

All Offerings

	Offering size	Proportional size	Market Cap	Book-to-Market
Mean	556	20.1%	10 264	0.46
Lower Quartile	90	2.7%	1 340	0.21
Median	196	7.3%	3 412	0.39
Upper Quartile	538	15.2%	9 892	0.64

Rights Offerings

	Offering size	Proportional size	Market Cap	Book-to-Market
Mean	703	23.6%	5 593	0.58
Lower Quartile	107	10.0%	769	0.30
Median	268	16.0%	1 736	0.52
Upper Quartile	735	28.3%	4 977	0.75

Public Offerings

	Offering size	Proportional size	Market Cap	Book-to-Market
Mean	524	19.4%	11 269	0.43
Lower Quartile	86	2.3%	1 478	0.19
Median	188	5.6%	3 928	0.37
Upper Quartile	476	12.2%	10 951	0.61

Offering size and market capitalization are measured in million offering-time US dollars.

3.3. Estimation methods

I calculate long-term abnormal returns using two different methods: the buy-and-hold abnormal returns method (BHAR) and calendar time method. BHAR-method is used in post-performance tests and price run-up tests. Calendar-time method is used only in post-performance tests. In both methods the abnormal returns are calculated using size and price-to-book matched reference portfolios. The method to calculate the returns of reference portfolios is similar to what Rau and Vermaelen (1998) used in their paper. This kind of sequential sort procedure is also used by for

example Ikenberry et al (1995), Barber and Lyon (1997), Barber et al. (1998) and Kothari and Warner (1997). I treat my sample of stocks that have been included in Stoxx-600 index as investment universe. I divided this universe to four portfolios based on the market capitalization at the beginning of the month and every one of these four portfolios was divided to four portfolios based on price-to-book ratios. As a total, 16 portfolios are formed and the composition of these portfolios is changed every month by rebalancing based on the changes in size and price-to-book ratio. The average return of stocks in the matching portfolio is used in calculation of abnormal returns in the same calendar month for the stocks with similar size and price-to-book class.

Rao and Vermaelen (1998) point out that monthly rebalancing avoid some problems related to annual rebalancing or matching firm methods; because it takes account the changes in size and price-to-book that happen over the year. They show that most firms change their portfolio assignments during the sample period. Therefore they argue that annual rebalancing or match firm methods does not adequately control for the changing risk characteristics. However the chosen method can exacerbates the rebalancing, new listing and skewness bias documented by Barber et al. (1999).

I calculate firm-specific holding period return and these returns were averaged to get the mean BHAR. Using holding period returns instead of summing short-period abnormal returns will eliminate the bias documented by Conrad and Kaul (1993). I study the statistical significance of these mean BHARs using basic Student t-test:

$$t = \frac{\overline{AR}_\tau}{\sigma(AR_\tau)/\sqrt{n}} \qquad (2)$$

There are problems associated with the use of standard t-test. For example Rau and Vermaelen (1998) point out that many of its assumptions like the normality, stationarity and time independence of observations can be broken in reality. Barber et al. (1999) show that the t-test statistics are biased because of long-horizon BHARs are positively skewed and this leads to negatively biased t-statistics.

To eliminate the skewness bias in t-statistics, I calculate the skewness-adjusted t-statistics developed by Johnson (1978):

$$t_{sa} = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma} \right) \tag{3}$$

Where $S = \dfrac{\overline{AR}_\tau}{\sigma(AR_\tau)}$, and $\hat{\gamma} = \dfrac{\sum_{i=1}^{n}\left(AR_{i\tau} - \overline{AR}_\tau\right)^3}{n\sigma\left(AR_\tau\right)^3}$

However I do not use the bootstrapped version of this skewness-adjusted t-statistics, which Barber et al. (1999) propose. They suggest that only the bootstrapped version and empirical p-values based on simulated distribution of mean BHARs estimated from pseudoportfolios will eliminate the skewness bias totally.

My main tests are t-tests that compare the abnormal returns in different portfolios. The high-dispersion portfolio is compared to low-dispersion portfolio. All these portfolios are expected to have similar kind of biases and therefore these difference tests should be unbiased. I am using basic t-test assuming unequal variances in these tests.

BHAR-method suffers from biases caused by cross-sectional dependence in sample observation. This bias can be eliminated by using calendar-time portfolio (Barber et al., 1999). Calendar-time portfolio method has also been advocated by Fama (1998) and Mitchell and Stafford (2000). Therefore I also use the calendar-time method to estimate the abnormal performance and its statistical significance.

I use the method similarly as Barber et al. (1999). First I calculate the abnormal return for each security using the returns of the size and price-to-book matched reference portfolios:

$$AR_{it} = R_{it} - R_{pt} \tag{4}$$

Then I calculate a mean abnormal return (MAR) across firms in the portfolio for each calendar month t:

$$MAR_t = \sum_{i=1}^{n_t} \frac{1}{n_t} AR_{it} \tag{5}$$

n_t is the number of firms in the portfolio in month t. These returns are equally weighted. Then grand mean monthly abnormal return (MMAR) is calculated:

$$MMAR = \frac{1}{T} \sum_{t=1}^{T} MAR_t \tag{6}$$

T is a total number of months in the sample period. The statistical significance of MMAR is estimated using formula below:

$$t(MMAR) = \frac{MMAR}{\sigma(MAR_t)/\sqrt{T}} \tag{7}$$

Announcement date tests are based on short-term abnormal returns that are calculated cumulating daily abnormal returns, which are calculated by formula:

$$AR_{ti} = R_{ti} - R_{it} \tag{8}$$

R_{it} is the daily return of STOXX-600 total return index. This formula assumes that all companies have beta of one and no adjustments for size or book-to-market are done.

The relationship between right vs. public offering decision and dispersion level at the month before the offering month is tested using Mann-Whitney-Wilcoxon test. This test uses observations' Wilcoxon scores, which are the ranks of the observations. I have used the average ranks for tied values. This test tests if the ranks of two groups are evenly distributed.

4. Theory and hypotheses

This section covers the theory how dispersion will affect the seasoned equity offerings and stock returns around them. First the theory is explained in overall level and then I show what kind of effect the forecast dispersion should have on price run-up, announcement effect and long-run underperformance based on the theory. In addition the theory about opportunistic companies is explained. Finally the main hypotheses are shown.

4.1. Theory

This theory explains the effect of financial analysts' EPS forecast dispersion on the equity issuance process. The basic framework is based on Miller's (1977) model. Investors' valuation for the company stock vary and they trade based on their own valuations. Miller assumes that markets for shorting a stock are not perfect. Short-sale costs can be too high for profitable trading or shorting services can be unavailable. Empirical tests by Danielsen and Sorescu (2001) show that short-sale constraints can be significant. D'Avolio (2002) also shows interesting results that short-sale constraints are higher among high-dispersion stocks. Investors with pessimist valuation are therefore excluded from the market and stock price is based on only the high-valuation by optimist investors. Stocks with high divergence of opinion are bid up by optimists and therefore those stocks become overvalued.

Diether et al. (2002) propose that in addition to short-sale constraints, any friction that prevents the revelation of negative information can exclude the negative investors from the market. They suggest that for example the incentive structure of analysts can cause the revelation. Self-censoring can cause analysts to stop following the stocks of which they have negative view and therefore the reported forecasts are upward biased. High-dispersion stocks are associated with more self-censoring and therefore these stocks are overvalued.

The model assumes that there are two different kinds of stocks in the market, high-dispersion stocks and stocks with normal or low dispersion level. The magnitude of valuation errors is

assumed to be higher among the high-dispersion stocks. The high divergence of opinion causes these stocks to be valued above the level that average investor seems to be fair. These stocks are harder to value, because these companies are associated with lower quality and less frequent disclosure. For example Lang and Lundholm (1996), Healy et al. (1995) and Barron et al. (1999) have found empirical evidence for this association. The unavailability of important information in addition to uncertain and potentially biased information disclosed can cause the valuation of average investor to be downward or upward biased compared to management valuation. Therefore the magnitude of undervaluation is higher among the high-dispersion companies than among other companies. Stocks with smaller short-sale constraints are more often undervalued. Stocks with low or normal divergence of opinion are not bid up much above their fair valuation and less uncertain information available makes the market valuation more correct.

The issuance decision and the choice of issuance method can be analyzed using the theoretical framework presented above. The availability of positive net present value (NPV) projects and the financial slack of the company are also affecting the issuance decision. The model assumes that financial slack includes also the possibilities to issue debt or convertible securities. In addition investment banks' underwriting decisions are affected by the issuers' level of dispersion. I assume that managers' act similarly as Myers and Majluf's (1984) model suggests. Their model is based on assumption that managers have superior information about the firm, for example they know if company stock is bid up to overvalued by optimists. Because of the superior information, there are asymmetric information between the managers and the investors in the market. Managers act in best interests of old shareholders and therefore they have a motive to issue overvalued equity. There is also empirical evidence that managers decide to issue equity when company stock is over-valued. Gentry and Mayer (2003) showed using Real Estate Investment Trusts that managers rarely issue equity when the price-to-NAV is below one and when the ratio is above one, then the likelihood of issuance rises rapidly. Clarke et al. (2001) show direct evidence that insiders attempt to issue overvalued equity in SEOs and the issues are cancelled if the over-valuation is eliminated.

Overvalued high-dispersion stocks are likely to choose public offerings. The issuance decision is not much affected by the company's need of capital, because the issuance of overvalued equity

itself is a positive NPV investment to current shareholders. However the issuance decision is affected by the investment banks actions. Highly prestigious investment banks are not eager to offer underwriting services to high-dispersion stocks, because their reputation may erode if they underwrite highly overvalued shares. I expect that the limit for the dispersion is negatively related to the offering size, because power of smaller offerings to erode the reputation is small. Investment banks with lower reputation can underwrite these offerings, but investors are not willing to pay the same price for these offerings. The lower offer price decreases the profitability of issuance and therefore big discounts to market price make issuers to cancel the offering. The investment banks decisions are also affected by investors' optimism, because during the periods of high investors' optimism also poorer offerings are well-accepted. This can cause the SEO volume to be positively associated with the dispersion.

Overvalued companies with too high level of dispersion have two choices if they want to issue equity. First they can delay the offering and try to decrease the level of dispersion by better disclosure and at the same suffer from the risk that over-valuation will disappear. Secondly they can choose to launch a rights offering. In both cases the issuance loses the positive NPV status and the financial slack and the NPV of the project become relevant factors. The rights offering has one advantage over delaying the issuance because investors can pool these companies with the undervalued companies that usually are more likely to arrange a rights offerings and therefore the choice of rights offering can allow the company to maintain the overvaluation. This suggested reason for rights offering is contrary to Eckbo and Masulis' (1992) suggestion that greater information asymmetry is associated with greater probability of public offerings. However they do not consider the investment banks' perspective, but only the company's perspective. I argue that some companies would like to launch a public offering instead of rights offering and that Eckbo and Masulis' model works only if every company could obtain an underwriter.

The under- and correctly valued high-dispersion stocks have different choices. Their choice of issuance is strongly affected by their financial slack and their NPV of the investment projects available. The potential to delay the investment has also a big impact on the issuance decision. Companies with urgent need of cash to finance investment projects with positive NPV are likely to choose rights offering, because that decision is in the best interests of current shareholders.

Many of these companies are struggling in poor financial situation and thus the positive NPV could arise simply from lower costs of financial distress. If the need is not urgent, then companies have another option: to start better disclosure. Less uncertain information can decrease the level of dispersion but it is also likely to increase the market valuation, because after the disclosure less biased estimates can be done. Companies with enough financial slack or no positive NPV projects available do not issue equity, because without the need of extra money, the issuance would be costly.

The more correctly valued low- and normal dispersion companies have three choices: public offerings, rights offerings and non-issuance. Companies with a lack of financial slack and positive NPV investment available choose the public offering if there is at least light over-valuation. However the magnitude of over-valuation is low because of low over-valuation, and therefore these offerings are zero-NPV projects. Correctly priced and under-valued companies may also choose rights offering, if existing shareholders take up is high. Companies with financial slack or no profitable investment available choose not to issue.

4.2. The effect of dispersion on the price run-up

I expect that the over-valued stocks with high-dispersion are associated with higher price run-up than other public offerings, if these stocks are experienced considerable increases in their dispersion level before the offering. The increase in dispersion causes the price to increase, because the optimists bid up the price. However the time period between the increase in dispersion and the offering can vary lot and therefore the results of price run-up tests can be sensitive to the duration of test period.

The over-valued high-dispersion stocks, which are obliged to launch a rights offering are associated with similar kind of price run-up, than similar stocks with public offerings. The under- and correctly valued high-dispersion stocks are expected to have negative stock price performance before the rights offering. The stock price performance of high-dispersion rights offering depends on the division of these cases to over- and undervalued stocks.

Low- and normal dispersion stocks launching a rights offering are associated with the normal stock price performance before the offering and stocks choosing the public offering have small price run-up.

4.3. The effect of dispersion on the announcement effect

The negative signal associated with the announcement of public offering causes the investors to adjust their valuations downwards. High-dispersion issuers have more negative announcement effect, because negative signal has bigger impact on optimistic valuation than on pessimistic valuation. The disappointed optimists adjust their valuation downwards, because they realize that stock is overvalued. Pessimists are not disappointed, because their valuation is lower than the market price before the announcement and therefore only small adjustment may occur. In the case of low-dispersion stock the marginal investors are only moderate optimistic and therefore their disappointment is quite small causing only a small adjustment. In addition I argue that the marginal investors do not adjust stock prices perfectly to eliminate the whole overvaluation immediately at the announcement, because they assume that the stocks are less overvalued than those are in reality. Investors also tend to underreact to reliable information and therefore only part of the overvaluation is eliminated at the announcement (Griffin and Tversky, 2003).

In the case of rights offerings, management has no incentive to sell over-valued equity and therefore the announcement effect should be smaller than in the case of public offerings. These stocks may have small negative effect, because of the costs related to offering. However the announcement effect can also be positive, because of the positive NPV investment available. As a conclusion I assume that the announcement of rights offerings should have only a minor effect. In addition I expect that the dispersion does not have major impact on the announcement effect of rights offerings.

4.4. The effect of dispersion on the long-run underperformance

Companies arranging public offerings are using windows of opportunities by taking advantage of over-valuation. The adjustment process that begins at the announcement will continue until the over-valuation is eliminated. Optimists will be disappointed if the new equity capital raised in the offering does not start yielding as well as they assumed and they continue adjusting their valuations closer to pessimistic valuations and this causes the divergence of opinion to decrease. The disappointment is more pronounced among the high-dispersion stocks. High-dispersion stocks are more over-valued and therefore they need to earn higher real rates of returns to make the realized returns to high enough. This is difficult to accomplish especially when they do not need positive NPV investment to be motivated to launch a public offering. In addition companies have to disclose at least mandatory information and this information can decrease the dispersion level, especially when the motives to disclose biased information are smaller after the offering. This decrease in dispersion also causes the over-valuation of high-dispersion stocks to become smaller as Miller's (1977) model suggests. High-dispersion stocks should therefore have more negative performance following the offer. The post-offering performance can be even more negative following the hot equity issuance market, because during those periods companies with very high dispersion can also launch public offerings and therefore issuers are associated with higher level over-valuation.

The case of rights offerings is different, because these stocks are not using windows of opportunities. In the case of high-dispersion companies the over-valued stocks are assumed to underperform because they have to disclose at least the mandatory information and dispersion should therefore decrease. On the other hand the undervalued high-dispersion stocks are assumed to outperform, because those stocks can exceed the market expectations easily and also the uncertainty is assumed to decrease because of active disclosure policy. Therefore empirical tests will solve the sign of long-term performance of high-dispersion rights offerings. The low-dispersion stocks that have launched a rights offering are assumed to have normal performance following the offering.

4.5. Opportunistic companies

Lang and Lundholm's (2000) find that stocks that increase their disclosure significantly before the offering are likely to be associated with higher price run-up, and more negative announcement effect and long-term performance. I assume that this effect is also related to the dispersion, but this time to the decrease in dispersion. I also assume that this opportunistic company theory is independent of the theory explained above. Companies in all dispersion levels have motive to spuriously increase their market capitalization before the offering and to try to make their own windows of opportunities. However the stocks with very high dispersion levels have smaller motive than other stocks, because they are afraid that opportunistic behavior will expose their overvaluation to the market.

The opportunistic behavior of these companies includes very active disclosure policy with positive tone and earnings management. Empirical dispersion literature has shown that voluntary disclosure can decrease the level of dispersion[18] and voluntary disclosure theories[19] have suggested that this decrease in dispersion is associated with positive stock price performance. These companies can make the windows of opportunity even better through the use of earnings management. For example Teoh et al. (1998a, 1998b) have shown that companies with high amounts of discretionary current accruals, predictor of earnings management, have suffered from poorer long-term underperformance following the offer than other companies.

I therefore expect that the most opportunistic companies, companies with biggest decrease in dispersion before the offering, are associated with price run-up, and poor announcement effect and long-term performance. At the announcement market participants partially realize that the opportunistic companies have manipulated their stock prices up. These companies cannot fill the investors' expectations following the offer and poor post-offer performance follows.

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[18] For example Lang and Lundholm (1996), Healy et al. (1995), Barron et al. (1999), Bowen et al. (2002), Clement et al. (2003) etc.

[19] For example Diamond and Verrecchia (1994), Barry and Brown (1985), Merton (1987) etc.

4.6. Main hypotheses

These are the main test hypotheses:

Companies launching public offerings:

1. Stocks with high-dispersion have higher price run-up than other stocks
2. Stocks with high-dispersion have more negative announcement effect than other stocks
3. Stocks with high-dispersion have more negative long-run performance after the offering than other stocks
4. Companies with high dispersion have increased likelihood of rights offering
5. Opportunistic companies disclose good information before the offering and have thus large changes in dispersion. Therefore these companies should be associated with high price run-up, poor announcement effect, highly negative post-offering performance

5. Test Results

In this part I show the test results based on the hypothesis presented at the end of the previous section. Stocks are required to have return and market capitalization data for 12 months following the offer, book-to-market data for the 12 months before the offering and dispersion data for the month before the offer month to be included in the initial sample. The abnormal returns of delisted stocks are assumed to be zero after the delisting. This sample makes it possible to estimate the post-offering long-term performance. In other tests, offerings which do not fulfill the extra requirements are eliminated. The initial sample size is 1336, of which 1106 are public offering and 230 rights offerings. The portfolio limits are based on the initial sample and are equal in every test. Same limits are used to make sure that stock is always in the same portfolio. The public offering sample is divided to four portfolios and rights offering sample to two portfolios based on the dispersion level at the month before the offering month. Less subtle division of rights offering sample is related to considerably lower sample size. The announcement date tests use slightly higher sample because only few days' returns and the

dispersion figure measured at one month before the offering month are needed. However the limits used are same. The public offering sample is again divided to four portfolios and rights offering sample to two portfolios based on the dispersion level at the month before the offering month.

5.1. Price run-up before the SEO

Stocks without return data or data for size or book-to-market adjustment for the year before the offering are excluded from the initial sample to get the sample for price run-up tests. After these extra requirements the sample size totals 1258, of which 1030 are public offerings and 228 rights offers. The abnormal returns used in tests are size- and book-to-market adjusted as explained in the data section. The sample period is from 12 months before the offering month to month before the issuance month. Both standard and skewness-adjusted t-statistics are presented.

Public offerings are associated with price run-up phenomena as you can see from the Table 4. All portfolios based on the dispersion level outperform their size and book-to-market adjusted reference portfolios. The high-dispersion stocks have the highest excess returns before the offering. The return of 12.91% is significant at 0.1% level (1% level if only standard t-test is applied). Other groups have abnormal returns in a range of 8.35% to 9.59%. All these returns are significantly different from zero at 0.1% level. These results are consistent with the hypothesis that high-dispersion stocks have higher price run-up. However the difference between the low and high-dispersion portfolio is not statistically significant (p-value is only 0.17), therefore the evidence about higher price run-up is not very strong. The dispersion change analysis shows that 75% of these stocks have had positive change during the year before the offering, and 66% of offerings have change bigger than 75^{th} percentile. The overall price run-up phenomenon is consistent with the earlier empirical evidence, for example Tripathy and Rao (1992) and Asquith and Mullins (1986) have found similar returns, however the duration of their test periods is much shorter. Based on the Figures 3 and 4 the price run-up phenomenon lasts quite long and therefore longer sample period is valid choice.

Table 4: Price run-up test results

The table shows the abnormal returns preceding the seasoned equity offering. The public offer sample is divided to four portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering. The rights offerings sample is divided to two portfolios based on dispersion level at the month preceding the offering. The abnormal returns are size- and book-to-market adjusted buy-and-hold returns. Those returns are calculated for the 12-month period starting at one year before the offering.

Public Offerings

	Dispersion at one month before the offering month			
	Less than 25%	Less than 50%	Less than 75%	More than 75%
Abnormal returns	8.96%	8.35%	9.59%	12.91%
t-value	4.96 ****	4.24 ****	4.70 ****	3.31 ***
Skew-adj. T-value	4.74 ****	3.72 ****	4.71 ****	3.59 ****

Rights Offerings

	Dispersion at one month before the offering month	
	Less than 50%	More than 50%
Abnormal returns	6.46%	-12.78%
t-value	2.30 **	-1.80 *
Skew-adj. T-value	2.36 **	-1.97 *

Statistical significance is based on basic Student t-test and skewness-adjusted t-tests. **** denotes that the value is significant at 0.1% level. *** denotes that the value is significant at the 1% level. ** denotes that the value is significant at the 5% level. * denotes that the value is significant at the 10% level.

The results related to rights offers can also be found in the Table 4. High-dispersion stocks are associated with poor performance before the offering. The return of -12.78% is significant at 10% level. The low-dispersion stocks have smaller price run-up of 6.46% (significant at 5% level). The abnormal returns of high-dispersion stocks are significantly different from the returns of low-dispersion stocks at 1% level. The results show that the abnormal returns of the undervalued high-dispersion stocks, of which many companies have financial difficulties, are so low that the positive abnormal returns of overvalued high-dispersion stocks are not high enough to change the returns of this portfolio positive. Unexpectedly the low-dispersion stocks outperform, my theory suggests that these stocks should have normal performance before the offering. The price run-up of these stocks may be related to early rights offerings in the sample, because much higher rights offering frequency could be related to some institutional constraints that favored the use of rights offerings. That I leave for future research.

Figure 3: The price run-up of public offerings

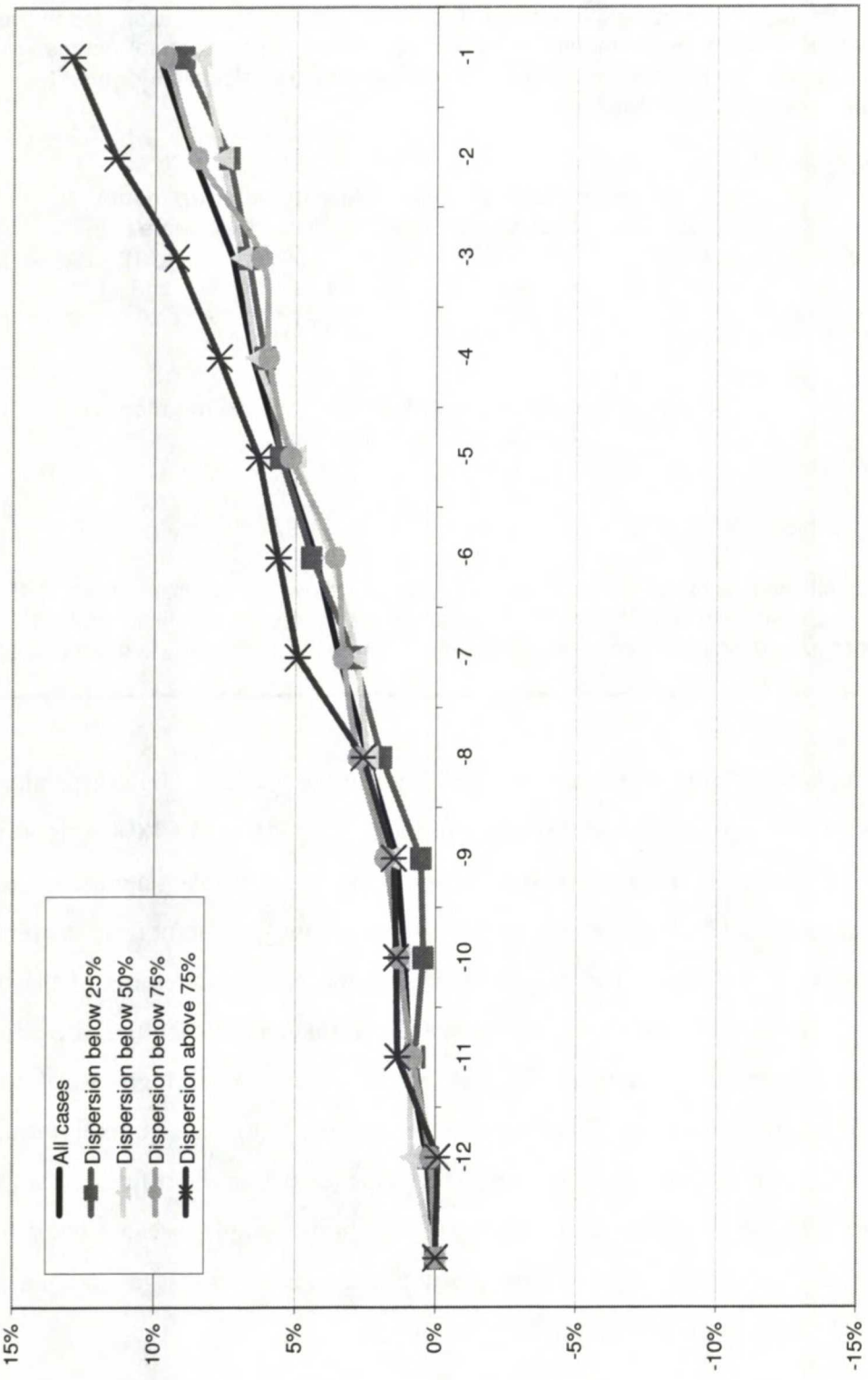


Figure shows the cumulative abnormal returns preceding the public offerings, from month -12 to month -1. The sample is divided to four portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns size- and book-to-market adjusted. Monthly rebalancing is used.

Figure 4: Price run-up of rights offerings

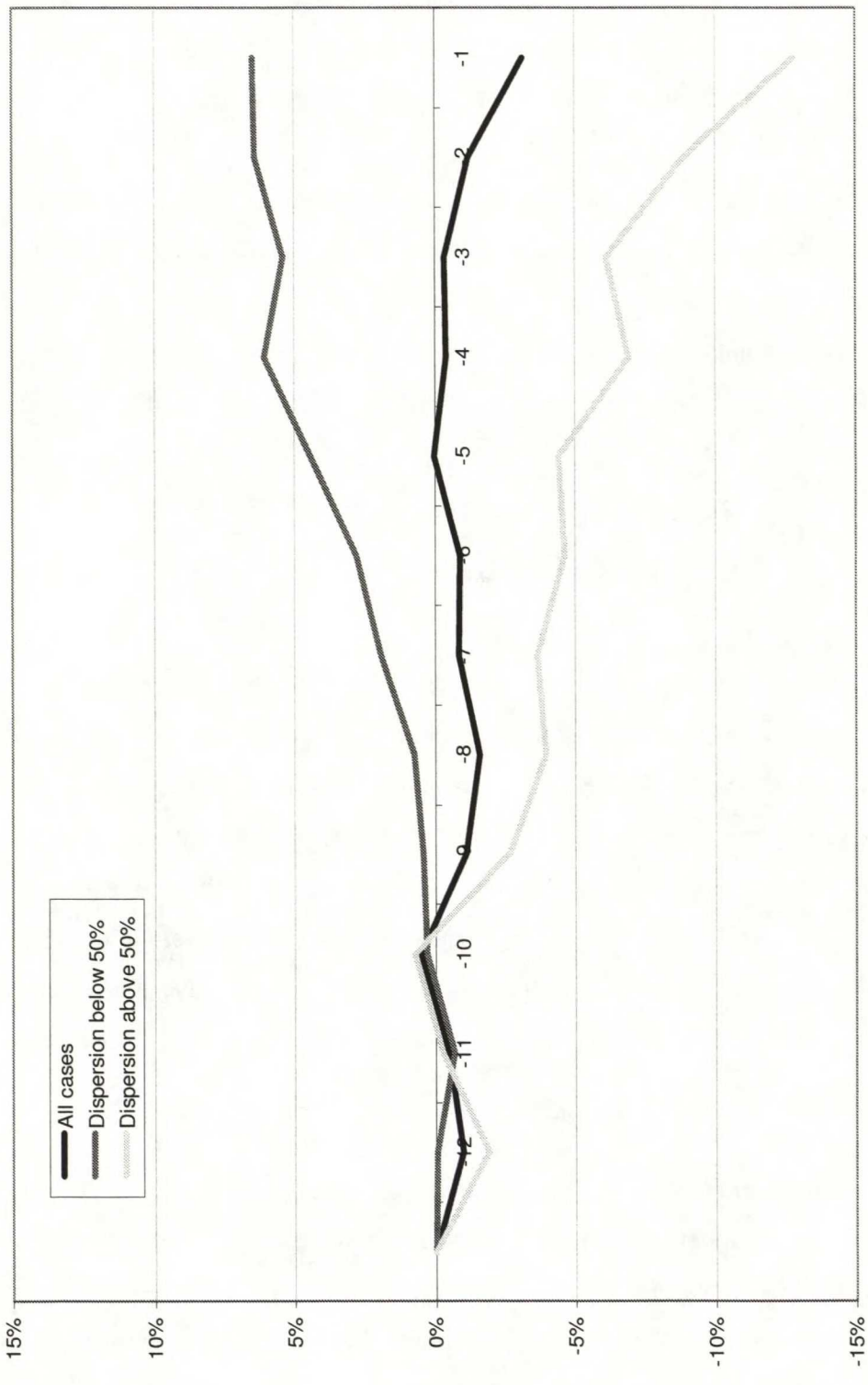


Figure shows the cumulative abnormal preceding the rights offerings, from month -12 to month -1. The sample is divided to two portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns size- and book-to-market adjusted. Monthly rebalancing is used.

The Figure 3 is related to the price run-up of public offering portfolios. All public offer portfolios outperform their reference portfolios steadily; however the high-dispersion group has somewhat higher abnormal returns during the last eight months of the test period. Other portfolios have no considerable differences between each others. The whole sample has abnormal return of 9.9% during the one year period. The return is highly significant (0.1% significance level).

The cumulative abnormal returns of rights offers during the year before the offerings are shown in the Figure 4. Rights offerings have normal performance until 10 months before the issuance month. After that the high-dispersion stocks start to underperform steadily and low-dispersion stocks on the other hand start to have positive abnormal returns. The whole sample has almost equal returns to their reference portfolios. The abnormal return of -3.1% is statistically insignificant.

5.2. Announcement effect of SEOs

I study the effect of dispersion on the announcement effect using issue date data, because the announcement day data was unobtainable. Mikkelson and Partch (1986) find that there is statistically significant decline in the stock price at the issue date, however the magnitude of this decline is small compared to announcement date. This lower magnitude may cause the test to become less powerful and therefore the effect of dispersion can be more difficult to find. In addition it is potential that issue date effect is caused by different factors than the announcement effect for example factors related to liquidity can explain the negative abnormal returns at the issuance and therefore the dispersion effect should be nonexistent. However I test if my hypotheses are relevant also using this data.

The sample will include the stocks with return data for the days -5 to +10 and the dispersion level data measured at one month before the offering month available. This requirement leads to sample including 231 rights offers and 1115 public offers. The abnormal returns are calculated using only market-adjustment, with market returns based on the returns of STOXX-600 total-return index and assuming that the beta of every stock is equal to one. The significance reported is based on standard t-test.

Table 5 shows the cumulative abnormal returns for two days' window starting at the day before the issue day. All portfolios based on the dispersion level have negative returns, between -0.45% and -1.16%. However, the high dispersion portfolio has slightly less negative (-0.45%) and insignificant returns. The returns of other dispersion level portfolios are significantly different from zero at least at 1% significance level. These results are not consistent with the hypothesis that high-dispersion stocks have the most negative announcement effect. This inconsistency could be related with the use of issue date data rather than announcement dates.

The overall results are consistent with the Mikkelson and Partch (1986) results and my hypothesis that public offerings have negative effect at the announcement. The magnitude of the effect is similar to Gajevsky and Ginlinger (2002) who studied the announcement effect of French public offerings. However many papers using non-US sample, for example Cooney et al. (1997) and Slovin et al. (2000) have found even nonnegative announcement effects. My results are inconsistent with papers studying the announcement effect using US data, for example Mikkelson and Partch (1986), Masulis and Korwar (1986) and Asquith and Mullins (1986) that have found approximately -3% return at the announcement. However the effect can be different in the case of non-US stocks, as many papers suggest, and therefore the inconsistency with the US results is not big surprise.

The abnormal returns around the issue date of rights offerings are also shown in the Table 5. These figures are consistent with the announcement date hypotheses that rights offerings have smaller announcement effect than public offers and that the sign of the announcement effect can be positive or negative. I assume that the negative announcement effect of high-dispersion stocks may be related to higher impact of issuing costs in the case of financially distressed companies. The positive announcement effect of low-dispersion stocks is related to positive NPV investment in which the proceeds are invested. The high dispersion portfolio has negative abnormal return of -0.56% and low dispersion portfolio positive (0.33%). However both these abnormal returns are not significantly different from zero. In addition there is no statistically significant difference between the returns of these portfolios based on t-test. These returns are more positive than found in papers by for example Eckbo and Masulis (1992), Gajevsky and Ginlinger (2002) and Hansen

(1988). The results are consistent with Smith's (1977) results. However, only Gajevsky and Ginlinger (2002) uses non-US sample with more current sample period.

Table 5: Announcement (issue date) effect test results

The table shows the abnormal returns around the issue date of the seasoned equity offering. The public offer sample is divided into four portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering. The rights offerings sample is divided into two portfolios based on dispersion level at the month preceding the offering. The abnormal returns are calculated using simple formula: return of the stock - return of the STOXX-600 index. Those returns are calculated for the day preceding the issue and for the issue date.

Public Offerings

	Dispersion at one month before the offering month			
	Less than 25%	Less than 50%	Less than 75%	More than 75%
Abnormal returns	-0.76%	-1.16%	-0.69%	-0.45%
t-value	-3.03 ***	-4.85 ****	-2.77 ***	-1.21

Rights Offerings

	Dispersion at one month before the offering month	
	Less than 50%	More than 50%
Abnormal returns	0.33%	-0.56%
t-value	0.72	-0.95

Statistical significance is based on basic Student t-test. **** denotes that the value is significant at 0.1% level. *** denotes that the value is significant at the 1% level. ** denotes that the value is significant at the 5% level. * denotes that the value is significant at the 10% level.

The Figure 5 shows the abnormal returns surrounding the issue date of public offerings and as you can see from the Figure 5 all portfolios have similar pattern. There are positive abnormal returns before the issue date. Day before and the issue date are associated with negative abnormal returns. Finally there is a recovery after the issue date. Portfolio with stocks having dispersion below median but above the 25% percentile underperforms others.

The Figure 6 shows the cumulative abnormal returns from the day -5 to day +10 around the issue date of rights offerings. As you can see from the Figure 6, both portfolios have negative abnormal returns before the issue date. The portfolio with low dispersion stocks recovers strongly and cumulative abnormal returns become positive. The total sample has no considerable drift to be observed and the high dispersion portfolio has negative drift.

Figure 5: The announcement (issue date) effect of public offerings

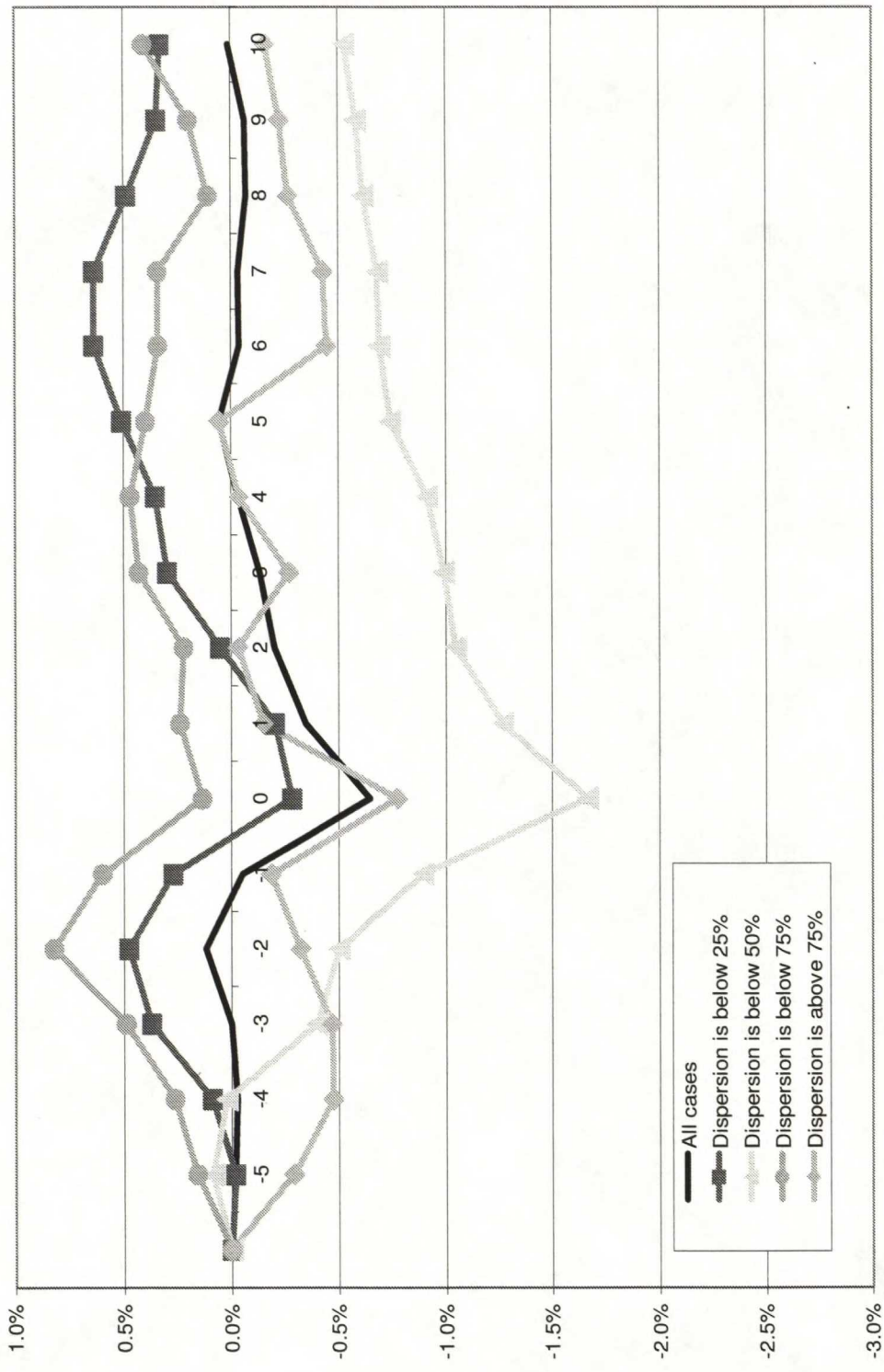


Figure shows the cumulative abnormal returns around the issue date of public offerings, from day -5 to day +10. The sample is divided into four portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns are calculated using the following simple formula: return of the stock - return of the STOXX-600 index.

Figure 6: The announcement (issue date) effect of rights offerings

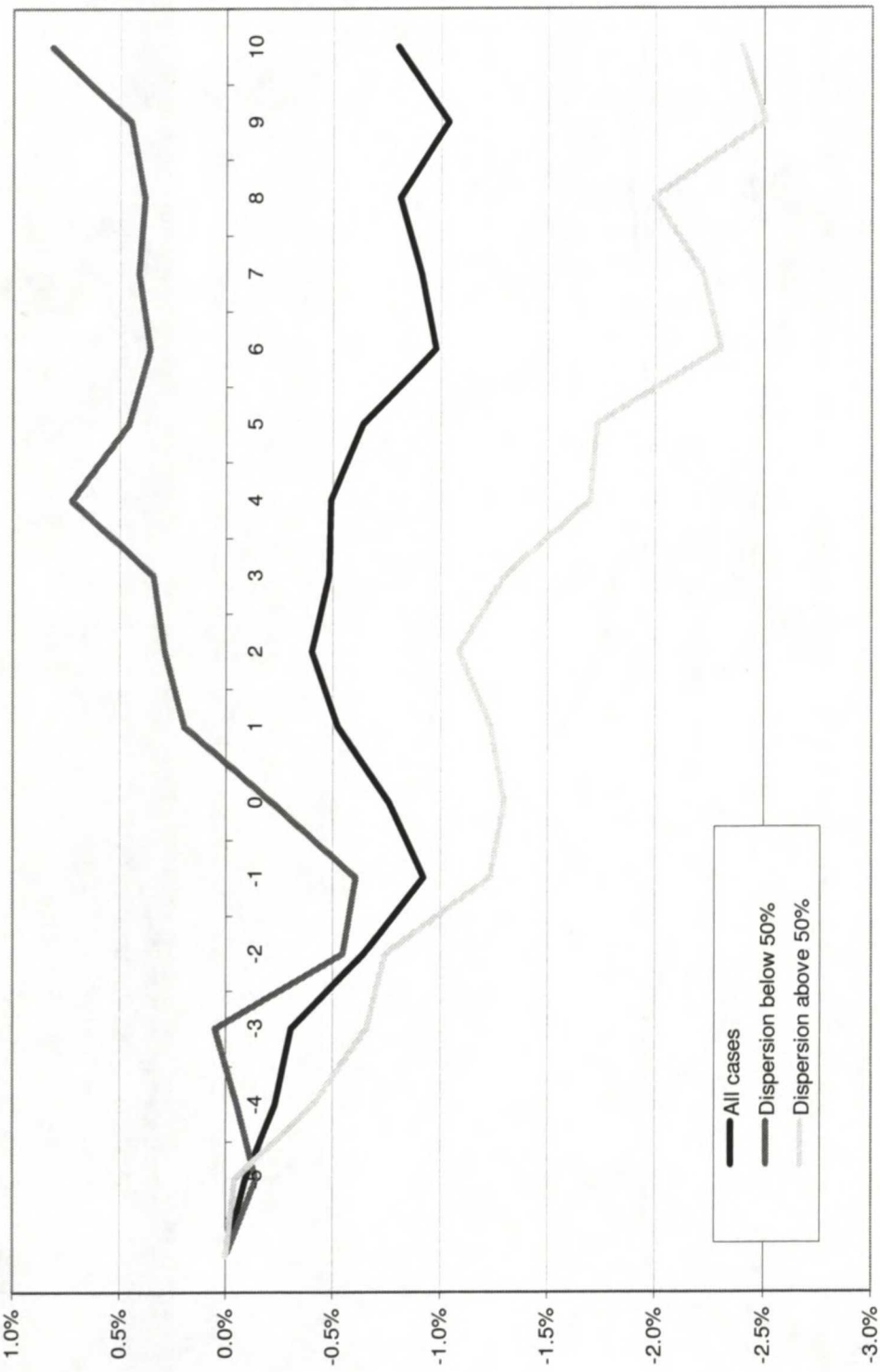


Figure shows the cumulative abnormal returns around the issue date of rights offerings, from day -5 to day +10. The sample is divided into two portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns are calculated using the following simple formula: return of the stock - return of the STOXX-600 index.

5.3. Long-term effect of SEOs

The sample size is 1336, of which 1106 are public offering and 230 rights offerings. The data requirements related to this sample are explained in the beginning of the results part. The significance reported here is based on both standard t-test and skewness-adjusted t-test. The abnormal returns are size and book-to-market adjusted using method described in the data section.

The Table 6 shows the post-offering abnormal returns for the year following the offer month for public offerings[20]. These results are highly consistent with the long-term hypotheses presented in the hypotheses section that high-dispersion stocks underperform other stocks. All portfolios based on the dispersion level have negative returns. Both low-dispersion portfolios have only slightly negative returns (-0.28% and -1.74%), which are statistically insignificant. The upper middle group has abnormal return of -6.32% that is significant at 1% level (5% level if only standard t-test is used) and high-dispersion group has abnormal return of -17.13% (significant at 0.1% level). This shows that stocks with high dispersion are able to use windows of opportunities. The post-offer abnormal returns for high-dispersion portfolio are significantly more negative at 0.1% significance level when compared to low-dispersion portfolios. The upper middle dispersion portfolio has also more negative returns when compared to low-dispersion portfolio at 10% significance level. This shows strong evidence supporting the hypotheses related to long-term performance following equity offerings. The underperformance observed in low-dispersion portfolios is so light, that the results suggest that market can estimate the magnitude of overvaluation of these stocks well and stock price adjustment at the announcement is almost perfect. The results also show that the long-term underperformance following the equity offerings is caused by high-dispersion stocks.

[20] The new results based on tests using public offerings sample from which the before index addition offerings are excluded are show here from the portfolio with the lowest dispersion to the portfolio with the highest portfolio: -4.1%, -0.8%, -6.9% and -18.5%.

Table 6: The test results of the post-offer long-run performance

The table shows the abnormal returns following the seasoned equity offerings. The public offer sample is divided into four portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering. The rights offerings sample is divided into two portfolios based on dispersion level at the month preceding the offering. The abnormal returns are size- and book-to-market adjusted buy-and-hold returns. Those returns are calculated for the 12-month period starting at the month following the offering.

Public Offerings

	Dispersion level at one month before the offering month			
	Less than 25%	Less than 50%	Less than 75%	More than 75%
Abnormal returns	-1.74%	-0.28%	-6.32%	-17.13%
t-value	-0.81	-0.14	-2.50 **	-4.60 ****
Skew-adj. T-value	-0.87	-0.15	-2.69 ***	-5.42 ****

Rights Offerings

	Dispersion level at one month before the offering month	
	Less than 50%	More than 50%
Abnormal returns	-2.34%	-4.83%
t-value	-0.86	-1.23
Skew-adj. T-value	-0.90	-1.25

Statistical significance is based on basic Student t-test and skewness-adjusted t-tests. **** denotes that the value is significant at 0.1% level. *** denotes that the value is significant at the 1% level. ** denotes that the value is significant at the 5% level. * denotes that the value is significant at the 10% level.

Long-term performance of rights offerings is also shown in the Table 6. Both the high and low-dispersion portfolios underperform, the high-dispersion one has lightly higher underperformance (-4.83% vs. -2.34%), but the underperformance of these portfolios is not statistically significant. I tested also if these returns are different from each others and find that there is no statistically significant difference. These results are consistent with my hypotheses that the windows of opportunity -hypothesis valid among public offerings is not relevant for rights offerings. Therefore there should be normal performance after the offerings. High-dispersion portfolio's negative abnormal returns show weak evidence that the absolute value of overvalued high-dispersion stocks' underperformance exceeds the absolute value of undervalued high-dispersion stocks' positive post-offer performance.

Figure 7: The post-offer long-run performance of public offerings

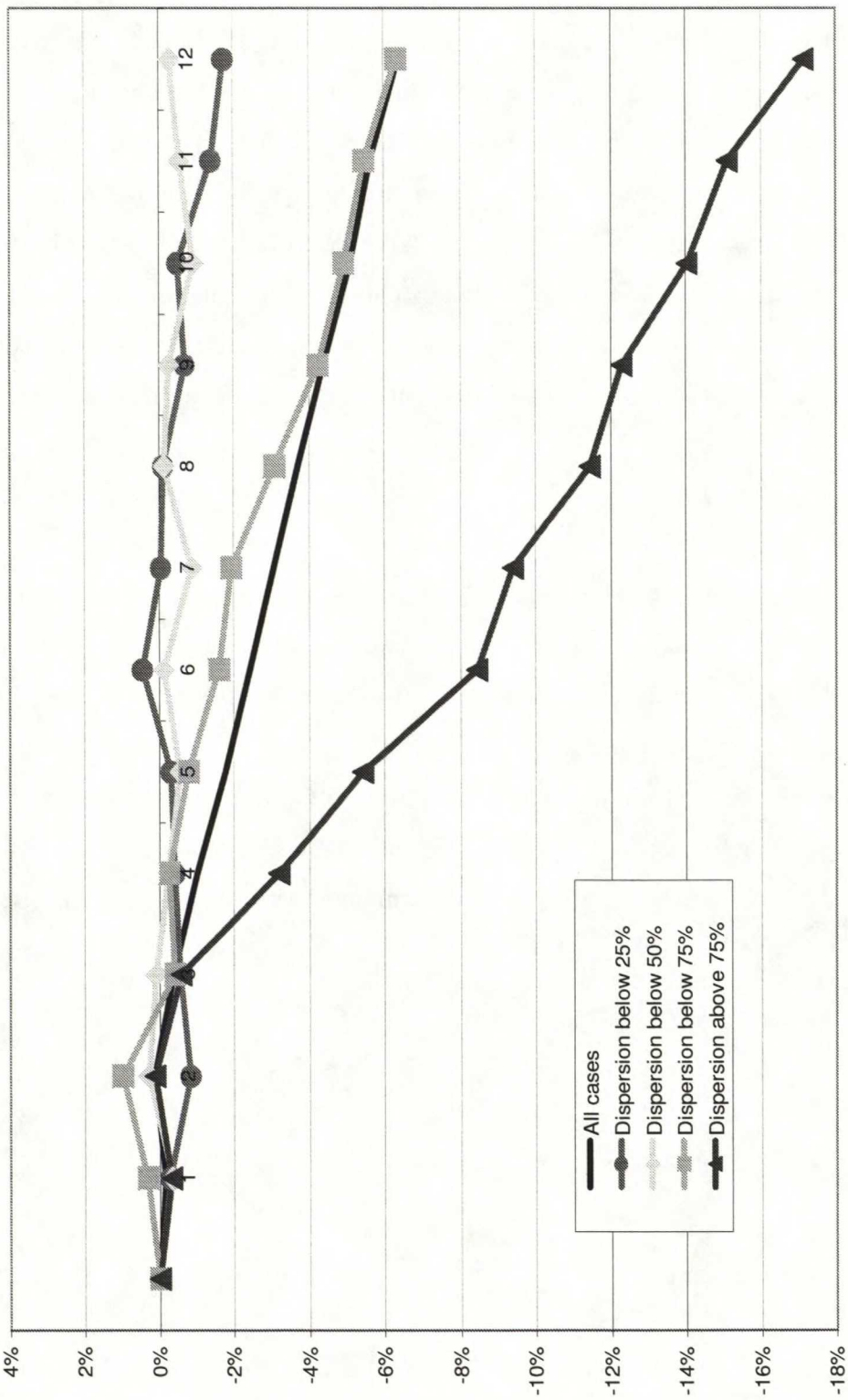


Figure shows the cumulative abnormal performance following the public offerings, from month +1 to month +12. The sample is divided into four portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns size- and book-to-market adjusted. Monthly rebalancing is used.

The underperformance of high-dispersion stocks following public offerings can be seen from the Figure 7. The effect is especially strong in the case of stocks with highest quartile of dispersion. The two high-dispersion portfolios cause also the whole sample to have long-term underperformance. The whole sample has abnormal return of -6.4%, which is significant at 0.1% level based on both standard and skewness adjusted t-statistics. This is somewhat smaller than many earlier papers, for example Loughran and Ritter (1995), Spiess and Affleck-Graves (1995) and Jegadeesh (2000) have found. These papers studied longer period following the offering, but I limit the duration of test period to one year to have maximum sample size. My results show that the dispersion effect can be seen easily with this choice of the duration. The stocks with less than median dispersion have abnormal returns equal to their reference indexes. The underperformance starts few months after the offering month, similar result as many earlier papers, for example Spiess and Affleck-Graves (1995), Tripathy and Rao (1992) and Mikkelson and Partch, have found.

The rights offerings have less pronounced effects, which can also be seen from the Figure 8. Similar kind of few months' positive performance is observable also in the case of rights offerings. After that underperformance of high-dispersion stocks start. The low-dispersion stocks start almost equal kind of underperformance few months later. The underperformance is weak compared to the high-dispersion stocks with public offering. The whole sample has abnormal return of -3.6%, which is statistically insignificant. These results are similar to other papers, for example Burch et al. (2004) studying the long-term underperformance of rights offerings.

Figure 8: The post-offer long-run performance of rights offerings

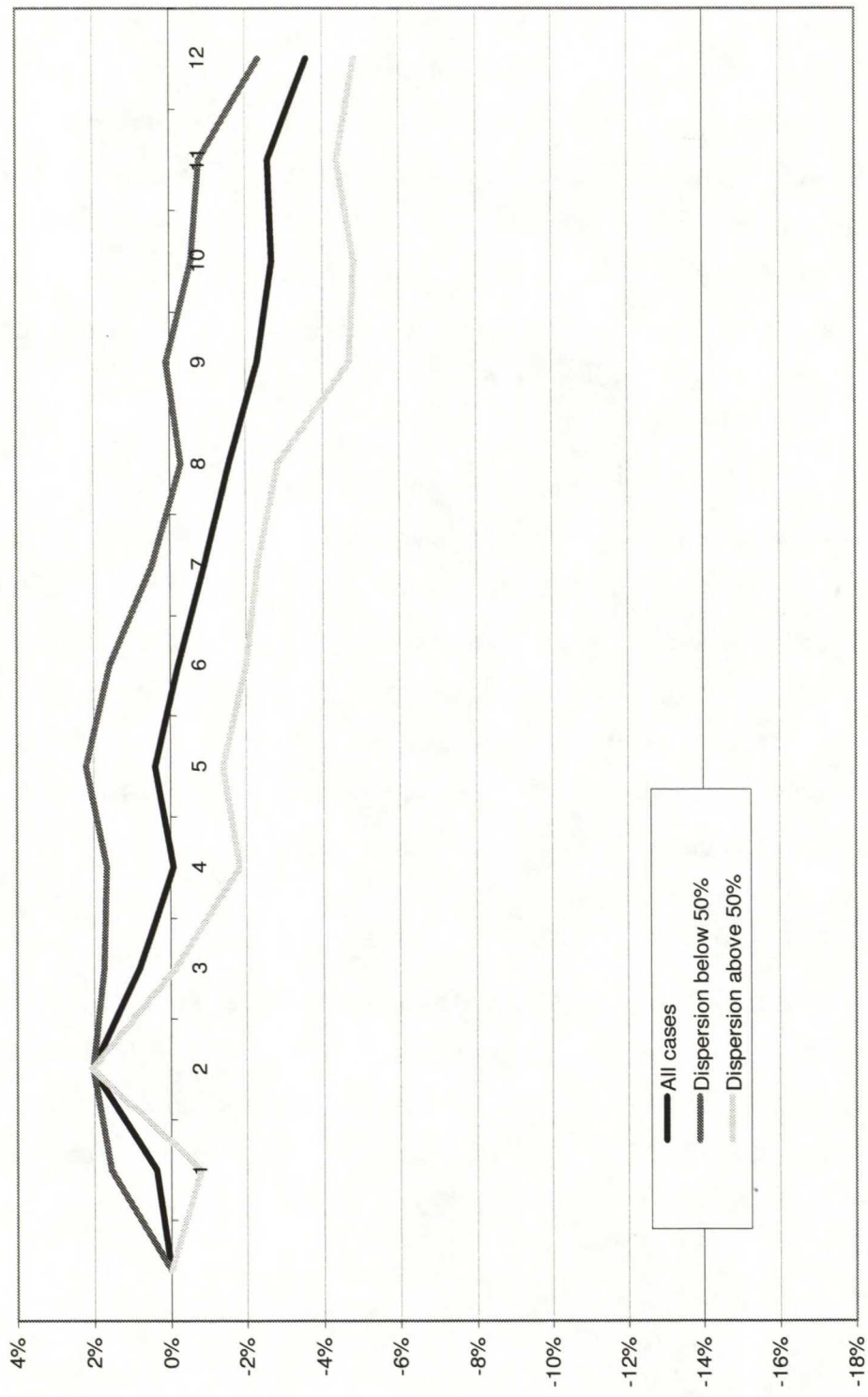


Figure shows the cumulative abnormal performance following rights offerings, from month +1 to month +12. The sample is divided into two portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns size- and book-to-market adjusted. Monthly rebalancing is used.

The test results based on the calendar-time approach point out that the test results based on the BHAR-method can be biased. At least these tests show that the underperformance effect is sensitive to the estimation method. The sample has monthly abnormal performance of -0.30%. However this figure is statistically insignificantly different from zero (p-value is only 0.104). This results is consistent with the another branch of papers studying the post-offer long-run performance, for example Brav et al. (1995) and Eckbo et al. (2000), which have found normal performance following the offer. It is potential that monthly abnormal performance figure is biased because of months with only few stocks in the portfolio, therefore I calculate also a new figure based on the months with over 50 stocks in the portfolio. This exclusion causes the number of sample months to decline with 13%. The new results: -0.36%, which is significant at 10% level, are therefore potentially less biased.

I divide the sample to three based on the dispersion level at the month before the offering month. The sorting is done using annual windows to make sure that dispersion limits stay valid. This method may limit the power of test because lower limits during low-dispersion years are associated with lower dispersion effect. The calendar-time test is made again for both extreme samples. The high dispersion portfolio consists of stocks with dispersion above the 60th percentile and stocks with dispersion level below the 40th percentile are included in the low-dispersion portfolio. The results are consistent with the long-term hypotheses presented in this thesis, that high-dispersion stocks underperform the other stocks. High-dispersion stocks have monthly underperformance of -0.55% (significant at 10% level). However the similar kind of bias caused by small number of stocks in certain months is affecting this figure. I decide to exclude months with less than 20 observations and new monthly abnormal return figure of -0.68% is calculated. This figure is statistically significant at the 5% level. The exclusion makes the sample size to decline by 12%. The low-dispersion group on the other hand has insignificant monthly abnormal return of -0.03%, and after the similar exclusion (14% of months excluded) the figure is -0.04%. Also this number is insignificantly different from zero.

5.4. Chronological development

The Figure 9 shows that dispersion levels in different years vary and that those are high during the hot periods in the equity markets, so this graph is consistent with the hypothesis that dispersion level is positively associated with the issuance volume. The investors' optimism should have highest impact on the high-dispersion stocks, and that can be seen from the graph by looking at the development of upper quartile, which shows the most dramatic changes. The post IT-bubble period has higher level of dispersion than the period before the IT-bubble. This could be related to institutional changes in the European equity issuance market between the periods.

I study also the post-offer long-run abnormal performance using annual samples to find if my hypothesis related to stronger dispersion effects during the hot periods is valid. The Table 7 shows the abnormal returns following the issuance for the high (over median) and low dispersion (below median) stocks that have launched a public offering. I have used same portfolio limits for every year to make sure that stocks with low-dispersion cannot be included to high-dispersion portfolio during the years with low average dispersion level. This choice of limits makes the sample size small for years with low average dispersion. The abnormal returns are size- and book-to-market adjusted. Statistical significances are not reported because of small sample sizes.

The Table 7 shows that the poorer long-run performance of high-dispersion stocks is robust effect. These stocks have negative returns following the offering except on year 2003 and in addition these stocks underperform the low-dispersion stocks in every year except on year 2003. Year 2003 is exceptional, because that year is associated with the most positive post-offer performance during the sample period and dispersion seems to have no effect on the long-run performance. During this year the equity issuance markets started to recover and it is potential that the good offerings were delayed because of low issuance activity during the years following the IT-boom and therefore the recovery year can be associated with above-normal percentage of good offerings. The table shows that hot issuance years are associated with poorer long-run performance. IT-boom years are associated with very negative long-run performance. Later research should confirm if this suggestion is also valid during other hot equity issuance periods.

Figure 9: The development of dispersion level

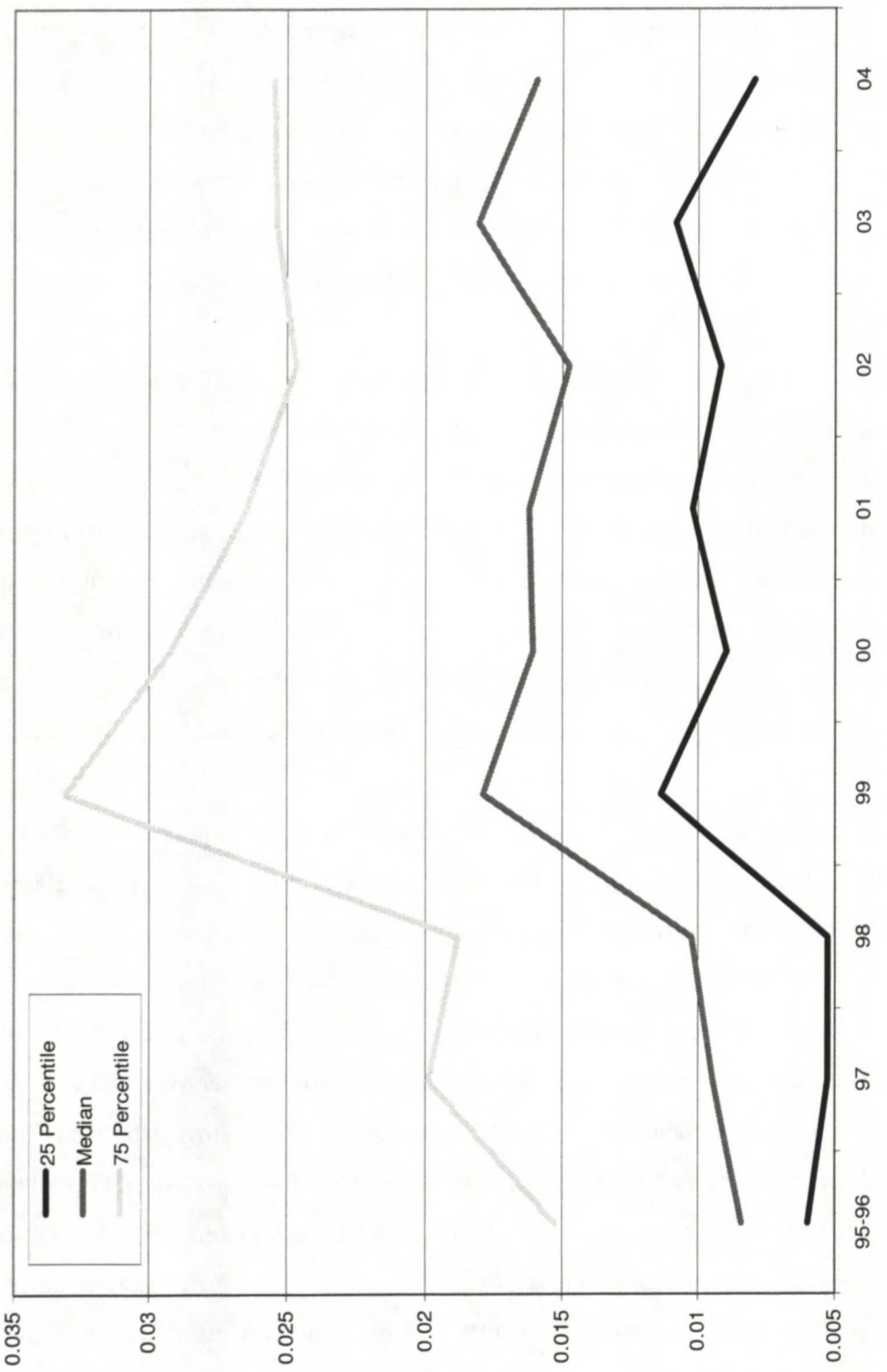


Figure shows the how the financial analysts' earnings per share forecast dispersion measured month before the public offering has varied during the sample years 1995-2004.

Table 7: Annual long-term tests for public offerings

The table shows the abnormal returns following the public offerings using annual samples. These public offer samples are divided to two portfolios based on the financial analysts' earnings per share forecast dispersion at the month preceding the offering. The same portfolio limits based on the total sample are used every year. The abnormal returns are size- and book-to-market adjusted buy-and-hold returns. Those returns are calculated for the 12-month period starting at the month following the offering.

	Dispersion is below 50%	Dispersion is above 50%
Year	Abnormal return	Abnormal return
1995-1996	3.26%	-0.16%
1997	2.67%	-2.09%
1998	3.84%	-7.84%
1999	0.54%	-9.07%
2000	-9.95%	-37.34%
2001	-6.90%	-16.23%
2002	-5.12%	-12.48%
2003	5.11%	6.68%
2004	3.02%	-0.89%

5.5. Opportunistic companies

The initial sample size for all opportunistic company tests except the announcement date test is 992 public offerings. The smaller sample size compared to dispersion level tests is caused by extra requirement that stocks should have dispersion data for the year before the offering. The opportunistic company hypotheses are relevant only in the case of public offerings and therefore the rights offerings are excluded. The abnormal returns are size and book-to-market adjusted using method described in the data section. The reported significance is based on standard t-test and the skewness-adjusted t-test. The sample is divided to four portfolios based on the change in dispersion between the months -12 and -1 before the offering month. The limits used are same in every test.

5.5.1. Price run-up

Price run-up test sample is based on the initial sample. Stocks without return data or data for size or book-to-market adjustment for the year before the offering are excluded. After these extra requirements the sample size totals 982 public offerings. The sample period is from 12 months

before the offering month to month before it. Both standard and skewness-adjusted t-statistics are presented.

Table 8: Price run-up test results for opportunistic companies

The table shows the abnormal returns preceding the public offerings. The sample is divided into four portfolios based on the change in dispersion during the year preceding the offering. The abnormal returns are size- and book-to-market adjusted buy-and-hold returns. Those returns are calculated for the 12-month period starting at one year before the offering.

Portfolios based on the change in dispersion

Biggest positive change is in the highest and biggest negative change is in the lowest percentile

	Less than 25%	Less than 50%	Less than 75%	More than 75%
Abnormal returns	14.03%	4.89%	7.52%	12.34%
t-value	5.17 ****	2.46 **	3.91 ****	3.74 ****
Skew-adj. T-value	5.61 ****	2.22 **	3.90 ****	4.13 ****

Statistical significance is based on basic Student t-test and skewness-adjusted t-tests. **** denotes that the value is significant at 0.1% level. *** denotes that the value is significant at the 1% level. ** denotes that the value is significant at the 5% level. * denotes that the value is significant at the 10% level.

Table 8 shows the price run-up based on the dispersion change portfolios. The low-change in dispersion group of stocks, the opportunistic companies, has highest abnormal return of 14.03%, which is significant at 0.1% level. The second highest return is found among the high-change portfolio, 12.34% (significant at 0.1% significance level). The middle change groups have lower returns: 4.89% and 7.52%, which are also significantly different from zero. These results are consistent with the hypothesis related to opportunistic companies, that these companies have high price run-up. This result shows that these companies are successful in their attempts to increase their market capitalization before the offering.

The opportunistic companies are divided quite levelly to dispersion level portfolios, however the stock with very high-dispersion have somewhat smaller representation in the portfolio; 15% of stocks in low-change portfolio are included in the high-dispersion portfolio. These figures show that this opportunistic company theory is independent effect as expected and also the smaller representation of high-dispersion companies is consistent with hypothesis that these companies are afraid of exposing their over-valuation to the market and therefore have fewer motives to be

opportunistic. The higher price run-up in the high-change portfolios is related to high-dispersion stocks. 90% (60%) of stocks in this portfolio have higher than median (75th percentile) dispersion level one month before the offering month. The abnormal returns of low-change stocks are significantly different from the lower middle group of stocks at 1% level. This shows that the results are strongly consistent with opportunistic company theory.

The high- and low-change portfolios outperform the mid-change groups and the whole public offer sample (Figure 10). All portfolios show good stock price performance compared to their reference portfolios. The start of price run-up is later in the case of mid-change group stocks. The outperformance of high-change portfolio (dispersion change group 4) starts later than low-change portfolio's high performance. The lower middle group underperforms the upper-middle group.

Figure 10: The price run-up of opportunistic companies

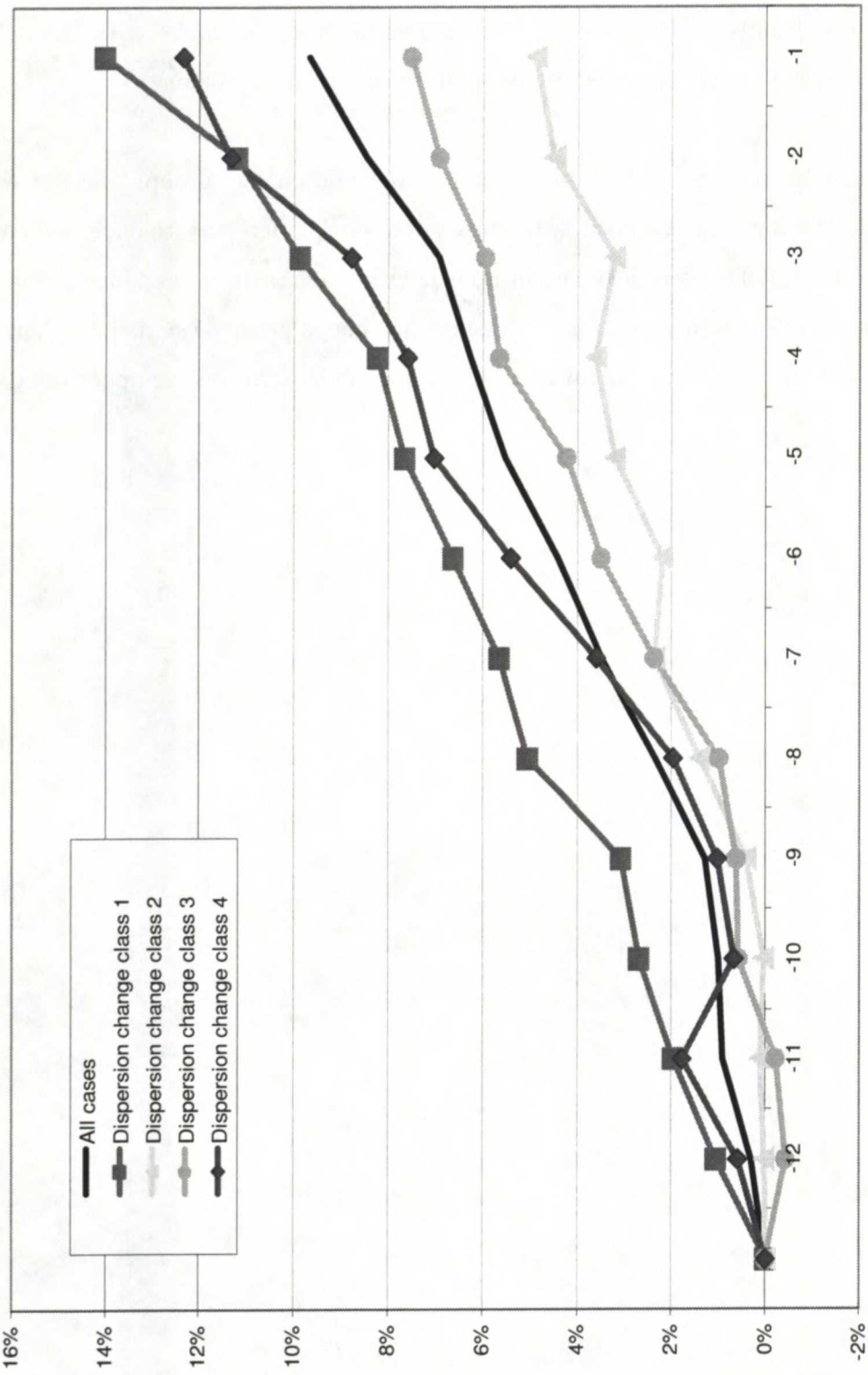


Figure shows the cumulative abnormal returns preceding the public offerings, from month -12 to month -1. The sample is divided into four portfolios based on change in the financial analysts' earnings per share forecast dispersion during the year before the offering (highest negative change is in the dispersion change class 1) and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns size- and book-to-market adjusted. Monthly rebalancing is used.

5.5.2. Announcement effect

The sample size for the announcement date test is 1000 public offerings. The sample will include the stocks with return data for the days -5 to +10 and the dispersion level of the month before the offering month available. The issue date data is used again in this test. The portfolio limits are based on the initial opportunistic company sample. This choice guarantees that stock is always in the same portfolio. The abnormal returns are calculated using only market-adjustment, with market returns based on the returns of STOXX-600 index and assuming that the beta of every stock is equal to one.

Table 9: The announcement (issue date) effect of opportunistic companies

The table shows the abnormal returns around the issue date of the public offerings. The sample is divided into four portfolios based on the change in dispersion during the year preceding the offering. The abnormal returns are calculated using simple formula: return of the stock - return of the STOXX-600 index. Those returns are calculated for the day preceding the issue and for the issue date.

Portfolios based on the change in dispersion

Biggest positive change is in the highest and biggest negative change is in the lowest percentile

	Less than 25%	Less than 50%	Less than 75%	More than 75%
Abnormal returns	-1.07%	-0.67%	-0.60%	-0.71%
t-value	-3.63 ****	-2.50 **	-2.18 **	-2.24 **

Statistical significance is based on basic Student t-test. **** denotes that the value is significant at 0.1% level. *** denotes that the value is significant at the 1% level. ** denotes that the value is significant at the 5% level. * denotes that the value is significant at the 10% level.

The Table 9 shows the cumulative abnormal returns of portfolios based on the dispersion change, which are in the range of -0.60% and -1.07%. All these portfolio returns are statistically significant at least at 5% significance level. The low-change portfolio has the most negative announcement effect of -1.07%. This is consistent with the hypothesis that opportunistic companies should have lower cumulative abnormal returns around the announcement, because markets are assumed to partially realize what these companies have been doing. The t-tests comparing the cumulative abnormal returns for low change to low middle change portfolio is however statistically insignificant (p-value is only 0.15) suggesting that hypothesis-consistent

results consistent may be caused by pure chance. I expect that the statistical insignificance of opportunistic company effect is related to issue date data used in announcement date tests.

The abnormal returns of portfolios based on the change in dispersion can be seen from the Figure 11. The returns of all portfolios behave quite similarly. There are positive abnormal returns before the issue date. Day before and the issue date are associated with negative abnormal returns. Finally there is a recovery after the issue date. Portfolio with higher change than median but lower than 75th percentile, outperforms others.

Figure 11: Announcement (issue date) effect of opportunistic companies

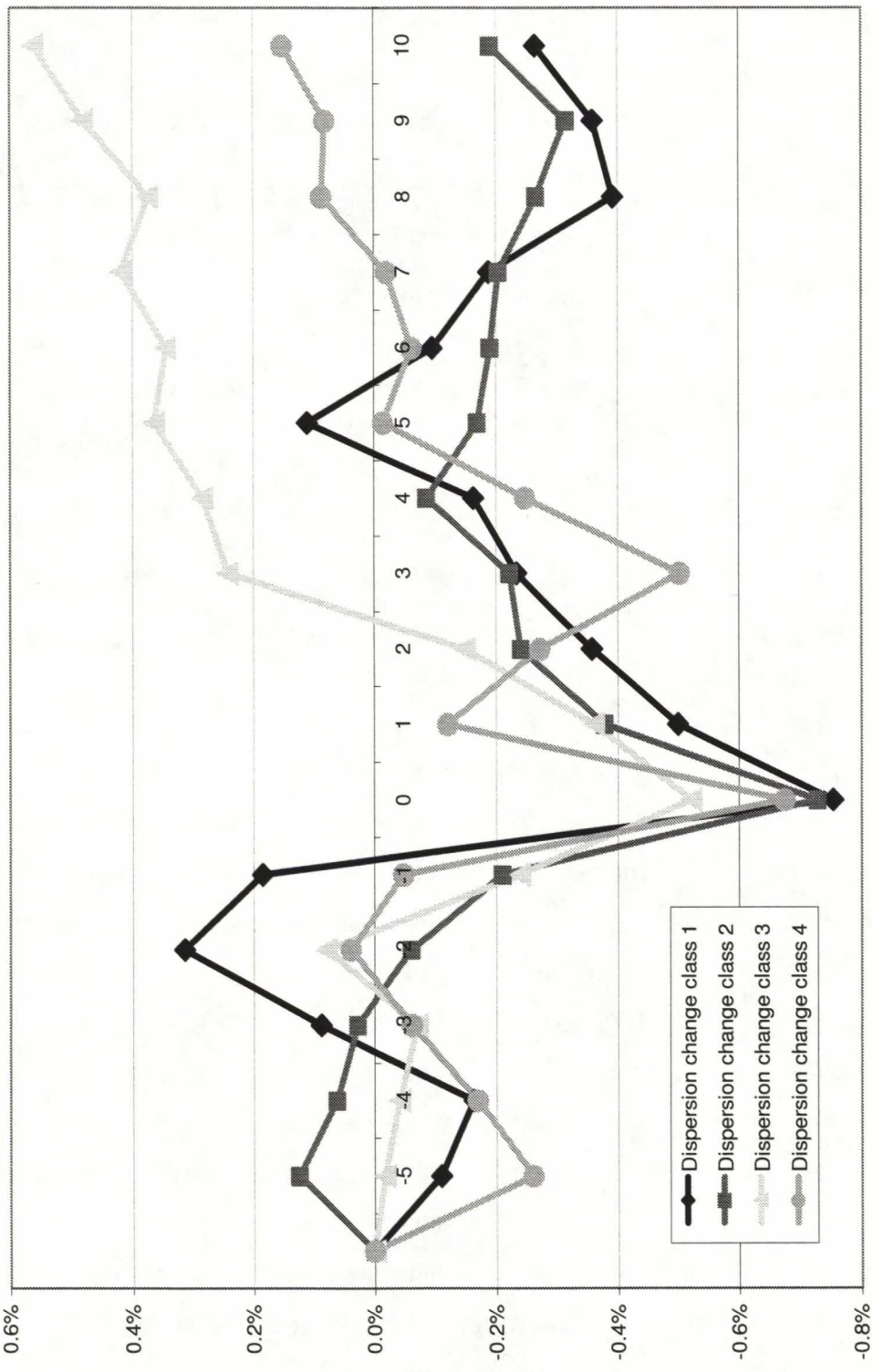


Figure shows the cumulative abnormal returns around the issue date of public offerings, from day -5 to day +10. The sample is divided into four portfolios based on change in the financial analysts' earnings per share forecast dispersion during the year before the offering (highest negative change is in the dispersion change class 1) and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns are calculated using the following simple formula: return of the stock - return of the STOXX-600 index.

5.5.3. Post-offering long-run performance

This test uses the initial opportunistic company sample which includes 992 public offerings. The significance reported is based on standard t-test and the skewness-adjusted t-test.

Table 10: The post-offering long-run performance of opportunistic companies

The table shows the abnormal returns following the public offering. The sample is divided into four portfolios based on the change in dispersion during the year preceding the offering. The abnormal returns are size- and book-to-market adjusted buy-and-hold returns. Those returns are calculated for the 12-month period starting at the month following the offering.

Portfolios based on the change in dispersion

Biggest positive change is in the highest and biggest negative change is in the lowest percentile

	Less than 25%	Less than 50%	Less than 75%	More than 75%
Abnormal returns	-8.25%	-3.21%	1.78%	-9.75%
t-value	-3.08 ***	-1.32	1.00	-3.24 ***
Skew-adj. T-value	-3.43 ****	-1.40	0.97	-3.55 ****

Statistical significance is based on basic Student t-test and skewness-adjusted t-tests. **** denotes that the value is significant at 0.1% level. *** denotes that the value is significant at the 1% level. ** denotes that the value is significant at the 5% level. * denotes that the value is significant at the 10% level.

The Table 10 shows that stocks with low-change in dispersion (opportunistic companies) have abnormal return of -8.25% and stocks with high-change have underperformance of 9.75%. Both returns are significantly different from zero at 0.1% level. The middle groups have insignificant excess returns (-3.21% and 1.78%). The low change portfolio has more negative returns than the lower middle group; however this result is only significant at 10% level. The results are consistent with the hypothesis that opportunistic companies have more negative long-term underperformance following public offerings than middle change groups. However the low significance shows that the evidence is not as strong as expected. It is potential that opportunistic companies cannot increase their market capitalization considerably before the offering and therefore the significance of long-term tests results could be low or that the investors realize the magnitude of over-valuation at the announcement quite well and therefore the overvaluation is almost totally eliminated at the announcement. The results of high-change group are related to the high-dispersion stocks' dominance in that portfolio.

The post-offer performance of dispersion change portfolios is shown in the Figure 12. The low-change portfolio starts underperforming right after the offering month. Other groups have the short-run abnormal return phenomena. After the short-run effect, the high-change portfolio starts having negative abnormal returns. The upper mid-group starts underperformance few months later; however it is clearly less severe. The lower mid-group has lightly positive abnormal returns.

Figure 12: The post-offer long-run performance of opportunistic companies

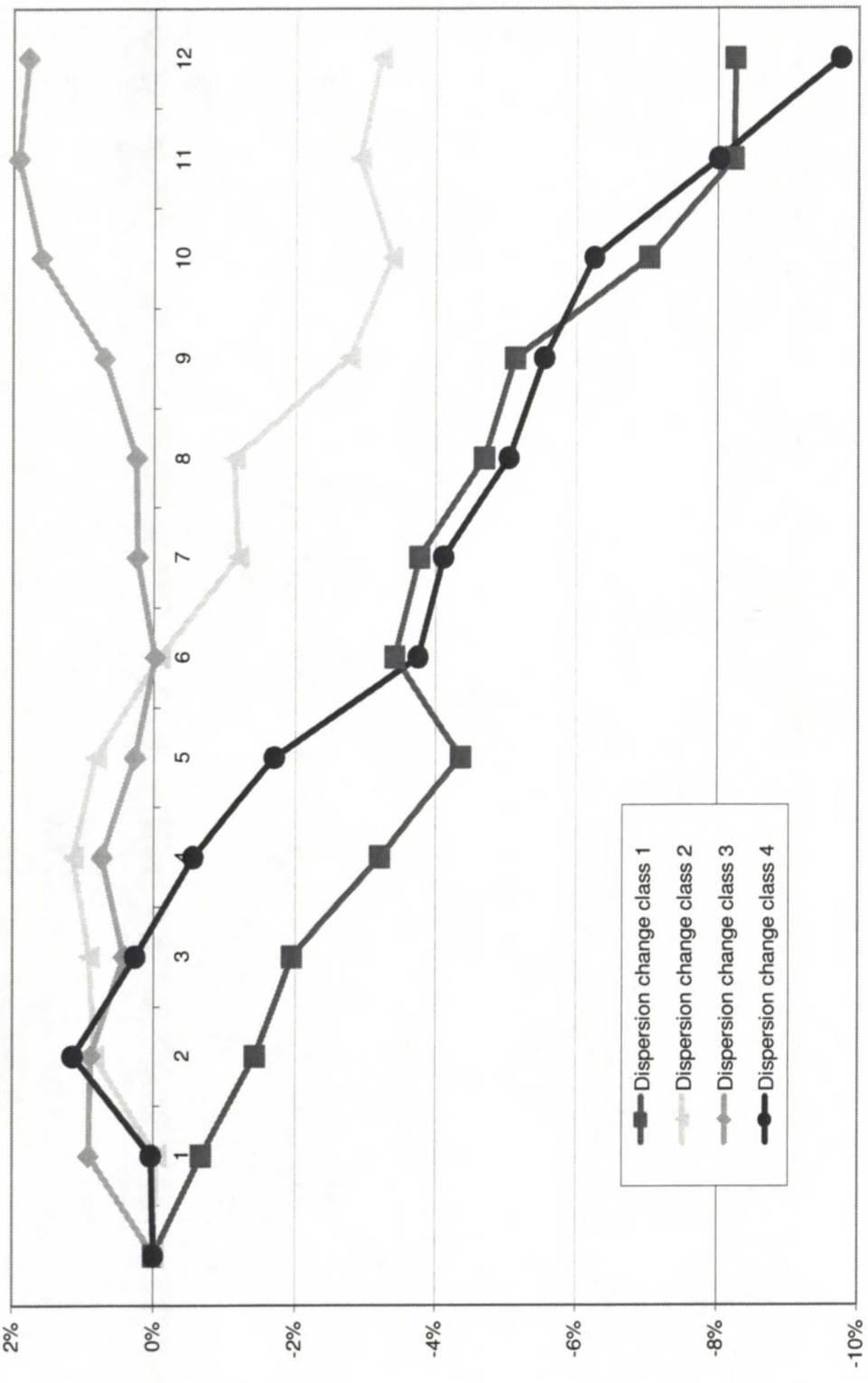


Figure shows the cumulative abnormal returns following the public offerings, from month +1 to month +12. The sample is divided to four portfolios based on change in the financial analysts' earnings per share forecast dispersion during the year before the offering (highest negative change is in the dispersion change class 1) and the performance of those portfolios and the whole sample is shown in the figure. The abnormal returns size- and book-to-market adjusted. Monthly rebalancing is used.

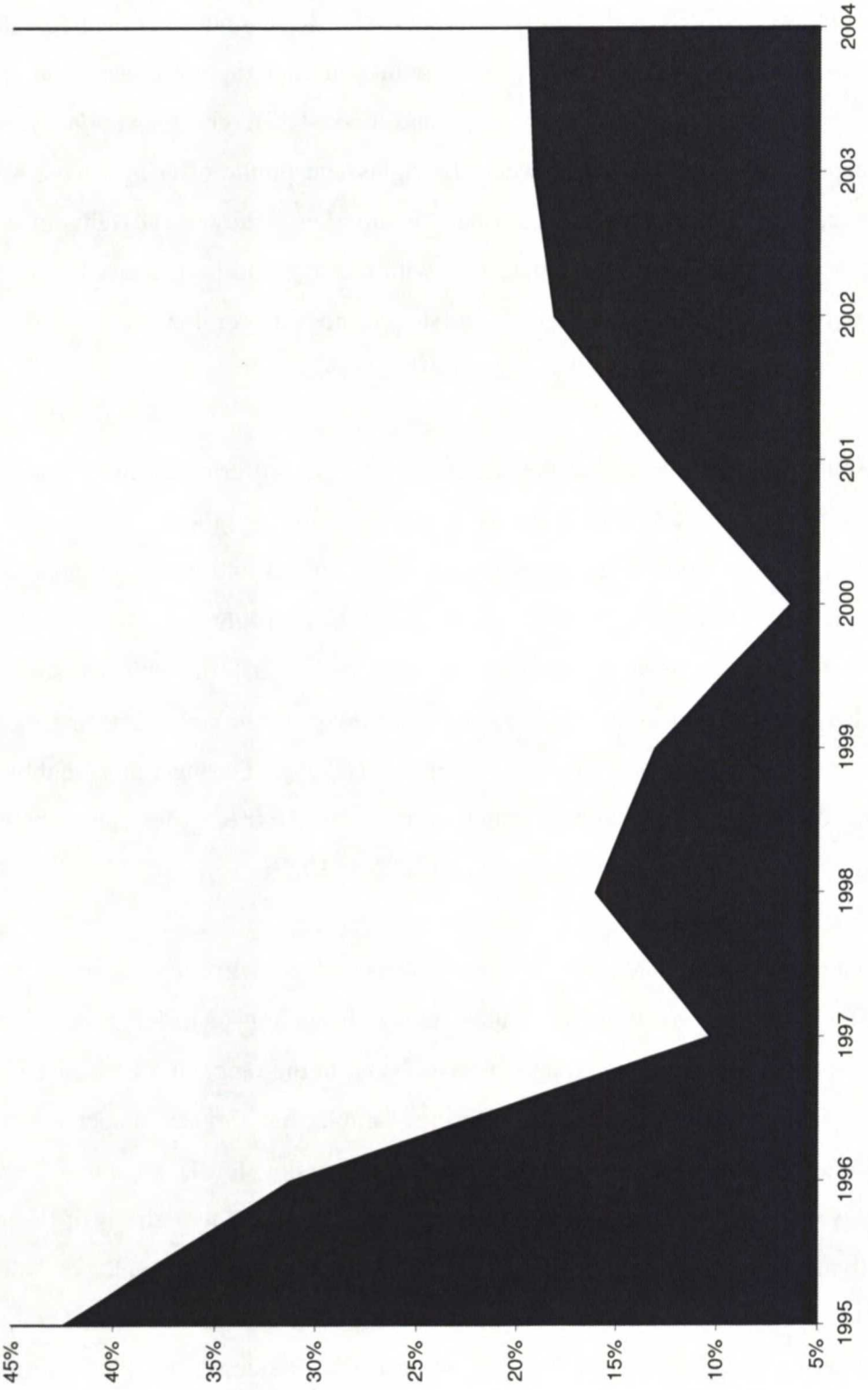
5.6. Choice between rights and public offerings

The sample used in this test will include equity offerings with dispersion level available at the month before the issuance month. First, two graphs point out that there are variation in the frequency of rights offerings between different years and among different dispersion classes. I test the effect of dispersion on the choice between the rights and public offerings using Mann-Whitney-Wilcoxon test. The descriptive statistics part of this thesis shows that rights offerings are bigger than public offerings and this is consistent with the hypothesis that investment bank actions are affected by the offering size. The dispersion limit is lower for big offerings and therefore rights offerings are associated with bigger offering sizes.

The Figure 13 presents some evidence that the frequency of rights offering is lower during the periods of high investors' optimism. This result is consistent with hypothesis, that stocks with very high-dispersion can launch public offerings during these periods and therefore those stocks do not have to use rights offering method. During years 1995 to 1996 there are lots of right offerings, 42.5% of offerings were done via rights in 1995 and 31.3% in 1996. I assume that during that period legal and institutional requirements were favoring the rights offering method. 1997 has actually quite low frequency of rights offerings (10.3%). During the IT-bubble the frequency of rights offering is low, in the range of 6.4% to 16.0%. After the bubble the percentage of rights offerings increases to the range of 18.2% to 19.5%.

Figure 14 shows that highest dispersion classes have higher incidence of rights offerings. In this quartile 21.9% of the offerings are done via rights. Other dispersion quartiles include almost equal amount of rights offerings, the percentage of those being in the range of 14.5% and 16.3%. Mann-Whitney-Wilcoxon test tests if rights offering sample has higher dispersion ranks compared to dispersion ranks of public offers. First the dispersion levels are ranked one to maximum. Average values are assigned to values that are tied. The initial hypothesis of the test is that the ranks are divided evenly among the sub-groups. The test statistics has a value of 167,232. Based on the normal approximation this statistics has a z-value of 1.77. One sided p-value for this figure is 3.8%. The results are consistent with my hypothesis that frequency of rights offerings is positively associated with the level of dispersion. The z-value includes continuity correction.

Figure 13: Annual frequency of rights offerings



The figure shows the chronological development in percentage of rights offerings in the sample during the sample period 1995-2004.

Figure 14: Frequency of rights offerings in dispersion classes

The figure shows the percentage of rights offerings in different dispersion level classes. Dispersion is measured at the month before the offering.

Hope (2003) finds that dispersion levels of European stocks excluding the companies from the UK are much higher than the dispersion levels of US stocks. I expect that this difference may partially explain the low frequency of rights offerings in the United States.

6. Conclusions

This thesis studies the effect of financial analysts' earnings per share forecast dispersion on the seasoned equity offering process. Especially I focus on the price run-up, announcement effect, long-term underperformance and the choice of issuance method. The dispersion figure used in this test is the I/B/E/S summary forecast dispersion scaled using the book-per-share value for the stock measured at year before.

This thesis combines five branches of literature: dispersion, announcement effect of equity offerings, long-term underperformance, disclosure and the rights offer paradox. Barron et al. (1998, 1999) model dispersion as a proxy for two different variables: asymmetric information and uncertainty and I have divided the literature review related to dispersion based on this division. Dispersion literature has found that stocks with higher dispersion in analysts' forecasts have significantly lower returns than otherwise similar stocks. For example Diether et al. (2002) propose that this negative association between the dispersion and returns is consistent with the Miller's (1977) theory. Miller suggests that only optimists hold the stock, because high short-sale costs exclude the pessimists from the market. Stocks with highest divergence of opinion (asymmetric information) are expected to be overpriced. Estimation risk (uncertainty) can also cause the negative association between risk and returns.

Myers and Majluf's (1984) model suggests that announcement of new equity offering conveys unfavorable information to the market. Their model assumes that there are information asymmetries between the managers and market and managers are expected to act in the best interest of current shareholders. The empirical evidence is supporting their model. For example Mikkelson and Partch (1986) find that seasoned equity offerings are associated with abnormal return of approximately -3%. Similar results are documented by numerous papers, for example

Masulis and Korwar (1986) and Asquith and Mullins (1986). Rights offerings and non-US public offering are found to be associated with smaller abnormal returns at the announcement (for example Eckbo and Masulis (1992), Gajevsky and Ginlinger (2002) and Cooney et al. (1997)).

Ritter (1991) finds that IPOs underperform significantly following the offer. He suggests that his results are supporting the hypothesis that companies can take advantage of windows of opportunities. Loughran and Ritter (1995) study also the SEOs and find that those underperform also during three to five years following the offer. Similar results are also posted by for example Spiess and Afleck-Graves (1995) and Jegadeesh (2000). Burch et al. (2004) find that rights offerings do not have long-term abnormal underperformance. The results of long-term event studies are criticized because of numerous statistical problems[21].

Theoretical disclosure literature argues that companies can decrease the information asymmetry by voluntary disclosure[22]. Better disclosure quality is found to be associated with decreases in dispersion by for example Lang and Lundholm (1986), Healy et al. (1995) and Barron et al. (1999). In addition different kind of informative releases by companies are found to have effect on the dispersion[23]. Higher disclosure frequency is found to be associated with equity issuance[24]. Lang and Lundholm (2000) also suggest that this higher frequency has effect on the announcement effect and long-term underperformance.

Eckbo and Masulis (1992) model tries to explain firm's choice of equity flotation method. The preference for firm commitments in the United States is a puzzle especially when rights offers have substantially lower flotation costs. Their model explains the puzzle by adding a new cost called adverse selection cost.

My sample includes all public and rights offering launched between 1995 and 2004 by stocks that have been included in the Dow Jones STOXX-600 index between January 1 1995 and December 31 2005. The dispersion data is from I/B/E/S Summary history file. Other data is collected using

[21] For example Barber and Lyon (1997), Kothari and Warner (1997) Barber et al. (1999), Fama (1998) and Mitchell and Stafford (2000).
[22] For example Barry and Brown (1984, 1985), Merton (1987) and Diamond and Verrecchia (1994)
[23] For example Clement et al. (2003) and Bowen et al. (2002)
[24] For example Healy et al. (1999) Frankel et al. (1995) and Marquardt and Wiedman (1998)

Thomson, Datastream and Worldscope. The initial sample size is 1513. I estimate the long-run abnormal performance using both the BHAR and calendar-time method. For BHAR both standard and skewness adjusted t-statistics are shown. My main test compares the abnormal performance between different group of stocks and by using this method many statistical problems can be mitigated.

The theory presented in this thesis is based on Miller (1977). High-short sale costs exclude pessimists from the market and stock price is based on only the high valuation by optimist investors. Stocks with high divergence of opinion become overvalued. Uncertainty complicates the situation and makes part of the high-dispersion stocks undervalued. Managers are assumed to act similarly to Myers and Majluf's (1984) model; they act in the best interest of current shareholders and try to issue overvalued equity. The theory assumes that investment banks are not willing to underwrite the public offerings launched by companies with very high dispersion, because they are afraid of losing their reputation. The only option for these companies to issue equity immediately is to choose rights offerings method.

My price run-up hypothesis assumes that the overvalued high-dispersion stocks are associated with higher price run-up than other public offerings, because these stocks experience considerable increases in dispersion before the offering. The test results show that these stocks have higher price run-up, but the results is not significant (p-value is only 0.17). All dispersion portfolios based on the public offering sample have price run-up, which is consistent with my theory.

The signal related to equity issuance announcement causes bigger adjustment to stock price in the case of high-dispersion stocks, because optimists become more disappointed than pessimist. The test results are not consistent with the hypothesis, but this could be related to the use of issue date data instead of announcement date data. All dispersion portfolios have negative abnormal returns around the announcement and that result is consistent with my theory.

The announcement does not eliminate the overpricing totally and therefore some companies can take advantage of their over-valuation. The more overvalued stocks are expected to have poorer

long-run performance. Test results are strongly consistent with this hypothesis. The abnormal returns of high-dispersion portfolio are significantly more negative than the returns of low-dispersion portfolios.

In addition I present a theory on opportunistic companies that try to increase their market capitalization by active disclosure policy and earnings management. If these companies are successful in their attempts, these companies should have higher price run-up, and poorer announcement and long-run performance than other companies except the high-dispersion stocks. The price run-up results are consistent with the theory, the announcement effect of opportunistic companies is poorer than other companies, but here results are not statistically significant (p-value is only 0.15). The long-run post-offer performance is consistent with the theory.

1 also argue that companies with very high-dispersion levels should have increased likelihood of rights offerings and decreased likelihood of public offerings. The test results are consistent with the theory.

The effect of dispersion on the announcement effect of seasoned equity offerings is still unclear and extra tests with new data can yield interesting results. Similar tests should also be run for the sample including at least US stocks and smaller stocks to make sure that the effect of dispersion on SEOs is not valid only in my sample. The rights vs. public offerings choice could be tested using regression with other potentially significant variables included. In addition it would be interesting to see if the dispersion can explain the differences in rights offering frequency between the United States and Europe. Studying the effect of dispersion on the volume effects of SEO announcement could also have interesting results. In addition, dispersion can have considerable effect on the observed patters around other corporate finance events, like mergers and acquisitions.

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